ADJUSTMENT DISORDER AS PROPOSED FOR ICD-11:

EMPIRICAL INVESTIGATIONS OF ITS VALIDITY AND APPLICATION OF A SOCIO-INTERPERSONAL FRAMEWORK MODEL AMONG INDIVIDUALS WHO EXPERIENCED INVOLUNTARY JOB LOSS

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To my husband James

who is always there for me, who supports me in every aspect of life,
and who always motivated me to carry on in times of hardship and frustration

And to my father Uwe

who always supported my education and my career,
and who showed me that it is never to late to embrace and overcome the challenges of life

Abstract

Adjustment disorder (AjD) describe exaggerated responses to psychosocial stressors. For ICD-11, the proposed core symptoms are preoccupation, failure to adapt, and significant impairment in functioning, which represents a major shift in the description of the disorder. The present cumulative dissertation collects systematic evidence for the validity of the new AjD definition in a sample who experienced involuntary job loss. A large-scale longitudinal study assessed individuals who recently lost their jobs up to nine months after their last day at work and again six months later.

The first paper established a measurement model for the main outcome, the Adjustment Disorder – New Module 20. The confirmatory factor analysis revealed that the items are best represented within a bifactor model with five correlated group factors plus one general factor. The dominant source of covariation was accounted for by the general factor representing all AjD items, suggesting unidimensionality of the construct. The second paper developed an aetiological model of AjD based on the socio-interpersonal framework model for stress-response syndromes. Several interpersonal variables were associated with more AjD symptoms. The inclusion of contextual factors can extend our knowledge of pathological reactions to stressful life events. The third paper identified three groups of individuals who differed in symptom severity over time by application of a latent class latent change model. One group evidenced high symptom severity at both assessments. Belonging this group was associated with several demographic and psychological characteristics. Selective prevention strategies that target high-risk individuals with specific stress-management skills training could be developed.

The synopsis of this cumulative dissertation provides a review of adjustment disorder as disorder specifically associated with stress in ICD-11. All three papers are integrated into an overall discussion about the validity of the ICD-11 definition of adjustment disorder, the context of involuntary job loss, and the treatment implications.

Zusammenfassung

Anpassungsstörungen (ASt) beschreiben eine maladaptive Reaktion auf psychosozialen Stress. Für die ICD-11 wurden neu die Kernsymptome Präokkpationen, Fehlanpassung und funktionelle Beeinträchtigung vorgeschlagen. Die vorliegende kumulative Dissertation sammelt systematisch Evidenz für die Validität der neuen ASt Diagnose in einer Stichprobe von ungewollt entlassenen Personen. Eine längsschnittliche Studie untersuchte Personen bis zu neun Monate nach ihrem letzten Arbeitstag und ein zweites Mal sechs Monate später.

Das erste Paper bestimmte das Messmodell für das zentrale Ergebnismass, der Adjustment Disorder – New Module 20. Die konfirmatorische Faktorenanalyse zeigte, dass die Items am besten in einem Bifaktor-Modell repräsentiert wurden, das aus fünf korrelierten Gruppenfaktoren sowie einem generellen Faktor bestand. Die Kovariation zwischen den Items wurden am besten durch den generellen Faktor erklärt, was für die Eindimensionalität des Konstrukts spricht. Das zweite Paper entwickelte ein ätiologisches Modell für ASt basierend auf dem Sozio-Interpersonellen Modell für Stressfolgestörungen. Mehrere interpersonelle Variablen waren mit stärkeren ASt-Symptomen assoziiert. Der Einbezug kontextueller Faktoren kann unser Verständnis von pathologischen Reaktionen in Bezug auf kritische Lebensereignisse erweitern. Das dritte Paper hat anhand eines Latent Class Latent Change Modells drei Gruppen von Individuen identifiziert, die sich durch die Symptomschwere zu beiden Messzeitpunkten unterschieden. Zugehörigkeit zu der Gruppe mit hoher Symptomatik war mit verschiedenen demographischen und psychologischen Variablen assoziiert. Diese Personen könnten durch selektive Prävention angesprochen und ihre spezifischen Stressmanagement-Fertigkeiten trainiert werden.

Die Synopsis der kumulativen Dissertation umfasst einen Überblick über ASt als Stressfolgestörung in ICD-11. Alle drei Paper werden in eine Diskussion über die Validität des ICD-11 Ansatzes, den Kontext Arbeitsplatzverlust, und Behandlungsimplikationen eingebettet.

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List of Abbreviations

ADNM	Adjustment Disorder – New Module
AjD	Adjustment Disorder
APA	American Psychiatric Association
BADI	Brief Adjustment Disorder Intervention
CIDI	Composite International Diagnostic Interview
CBM	Confirmatory Bifactor Modelling
CFA	Confirmatory Factor Analysis
CPTSD	Complex Posttraumatic Stress Disorder
DSO	Disturbances in Self-Organisation
DSM	Diagnostic and Statistical Manual for Mental Disorders
FTA	Failure to Adapt to the Stressor
HPA	Hypothalamic-Pituary-Adrenal
ICD	International Classification of Diseases
LCA	Latent Class Analysis
LPA	Latent Profile Analysis
PGD	Prolonged Grief Disorder
PRE	Preoccupation with the Stressor
PTSD	Posttraumatic Stress Disorder
SAM	Sympatho-Adreno-Medullar System
WHO	World Health Organization

1. Introduction

Both normative life events, such as starting school, moving out of the parents house, or retirement, and non-normative life events, such as developing a chronic illness, going through a divorce, or experiencing an accident, require adjustment to changes in an individual's life. In fact, significant life events can be seen as one of the organizing principles for developmental change during adulthood (Baltes, Lindenberger, & Staudinger, 2006). They can vary in their duration and in their intensity, constituting daily hassles, chronic difficulties, critical life events or traumas. Exposure to life events in the general population samples goes up to 11.5% (Maercker, Hecker, Augsburger, & Kliem, 2018) in consideration of traumas, up to 53.9% considering critical life events (Maercker et al., 2012), and up to every individual bearing in mind daily hassles. A clear demarcation between these types of stressors is not possible but they all have in common that they create a disequilibrium in several life domains, and that they bear the risk for crisis and psychopathology if an individual is overwhelmed by the experiences. Stressful experiences have been discussed as a risk factor in the development of numerous mental disorders, such as depression, generalized anxiety disorder, or substance use disorders, but they can also be the direct cause of psychopathology and lead to disorders that are specifically associated with stress exposure and that share a specific phenomenology. The prototype of such conditions, the posttraumatic stress disorder as reaction to traumatic events, is well understood regarding aetiology, symptomatology, and treatment. Its sibling diagnosis, adjustment disorder, however is until today ill-defined and under-researched, and the understanding of pathological reactions to common life events is still poor.

In line with the recent redefinition of the disorder in preparation for the 11th version of the International Classification of Diseases (ICD-11), the present thesis aimed to enhance the

understanding of maladjustment to life stress. Based on the new definition of adjustment disorders, a large scale study among individuals who involuntarily lost their jobs was conducted and three papers were produced. The first paper focused on the measurement of adjustment disorder symptoms through questionnaire assessment; the second paper concentrated on the application of a theoretical framework model for stress-response syndromes and on the identification of associated characteristics of adjustment disorder symptoms; and the third paper investigated the course of adjustment disorder symptoms over time. In the following summary of this cumulative dissertation, a definition of adjustment disorder (Chapter 2) and an overview over the classification of disorders specifically associated with stress (Chapter 3) will be given. Afterwards, theoretical models that may explain symptom formation in adjustment disorder will be reviewed (Chapter 4). The context of job loss will be introduced briefly (Chapter 5). After this theoretical and empirical background, the present thesis will be introduced with its main research questions and its general study design. The three papers will be summarised and their main findings highlighted (Chapter 6). Chapter 7 is dedicated to a thorough discussion of these findings. It will highlight the current empirical evidence for adjustment disorders in ICD-11 and discuss future directions for research and practice. The last chapter (Chapter 8) will provide the full-length manuscripts of the three papers.

2. Adjustment Disorder

Adjustment disorder (AjD)[1] refers to the presence of clinical relevant symptoms that are caused by the exposure to a psychosocial stressor (World Health Organization, 2018; American Psychiatric Association, 2013). This maladjustment can manifest in cognitive symptoms, such as excessive worry about the consequences of the stressor, in emotional symptoms, such as low mood, or in behavioural symptoms, such as withdrawal from social interactions. These symptoms cause significant distress and interfere with the psychosocial functioning of the affected individual. Prevalence rates of AjD differ extremely between populations, assessment instruments used, and diagnostic criteria applied. In general population-based samples, prevalence rates range between 0.5% and 2.0% (Ayuso-Mateos et al., 2001; Casey et al., 2006; Glaesmer, Romppel, Brähler, Hinz, & Maercker, 2015; Maercker et al., 2012), with prevalence rates up to 3.7% in old age (Arbus et al., 2014; Maercker et al., 2008). In medical settings, prevalence rates are usually higher. Among primary care patients, 2.9 – 7.8% are diagnosed with AjD (Fernandez et al., 2012; Taggart et al., 2006). Prevalence rates go up to 12% in liaison psychiatry settings (Strain et al., 1998) and up to 17.1% in emergency departments (Bruffaerts, Sabbe, & Demyttenaere, 2004). When looking at specialised medical settings, such as oncology or heart surgery, prevalence rates range between 14% and 35% (Akechi, Okamura, Nishiwaki, & Uchitomi, 2001; Dew et al., 2001; Mitchell et al., 2017; Okamura et al., 2000). AjD is also a common diagnosis among individuals that experienced a specific life event, such as burglary victims (34%; Bachem & Maercker, 2016b) or refugees (5.7 – 40.3%; Dobricki, Komproe, de Jong, & Maercker, 2010). Some studies reported higher prevalence rates for women compared to men (e.g. Ayuso-Mateos et al., 2001; Bruffaerts et al., 2004). Among psychiatrists, AjD was

[1] The abbreviation AjD was chosen because the abbreviation of AD is commonly used for Alzheimer's disease.

the 7th most frequently used diagnostic category (Reed, Correia, Esparza, Saxena, & Maj, 2011) and it ranked 9th among clinical psychologists (Evans et al., 2013). Overall, the prevalence rates for AjD highlight that critical life events can cause varying degrees of psychopathology and create conditions that are frequently present in mental health care settings. Hence, a systematic inclusion of AjD in diagnostic and treatment guidelines is essential to provide adequate care for affected individuals.

The idea that critical life events can cause short-term adverse reactions has been incorporated in the classification system for a long time. The International Classification of Diseases (ICD) from the World Health Organisation (WHO) included a *Transient Situational Disturbance* in the 9th edition (WHO, 1976) and the Diagnostic and Statistical Manual for Mental Disorders (DSM) from the American Psychiatric Association (APA) included a *Transient Situational Personality Disorder* in its 1st edition (APA, 1952). Over the years, these disorders were redefined and labelled *Adjustment Disorder* (APA, 1980; WHO, 1992). Currently, both diagnostic systems use the term adjustment disorder to describe the development of psychopathology in direct connection to a critical life event. The diagnostic criteria used in ICD-10 and DSM-5 will be outlined in the following.

2.1. Adjustment Disorder in the current Diagnostic Manuals: ICD-10 and DSM-5

The ICD-10 groups AjD under *F4 – Anxiety, Dissociative, Stress-related, Somatoform and Other Nonpsychotic Mental Disorders* in the subgroup *F43 Reaction to Severe Stress, and Adjustment Disorders*. This puts AjD in the broader context of anxiety-related and fear-based disorders. The diagnostic code F43.2 AjD includes the following criteria: (A) the development of emotional or behavioural symptoms within one month after the occurrence of a life stressor; (B) the symptoms that occur are of a type found in many affective, neurotic, stress-related, somatoform, or conduct disorder but do not meet quantity or quality of the criteria of an

individual disorder; and (C) the symptoms do not persist longer than six months after the stressor or its consequences are terminated (exception: longer depressive reaction up to two years) (WHO, 1992). The fifth digit specifies subgroups of AjD, namely brief depressive reaction, prolonged depressive reaction (up to two years), with anxiety, with mixed anxiety and depressed mood, with disturbance of conduct, with mixed disturbance of emotions and conduct, and with other symptoms (WHO, 1992). The subgroups are used to specify which symptoms are predominantly present, as the general AjD criteria do not define any specific symptoms.

The DSM-5 uses a similar description of AjD and defines the following criteria: (A) the symptoms develop within three months after the onset of a stressor; (B1) the symptoms cause marked distress that is stronger than usually expected in response to a stressor or (B2) significant impairment in important areas of functioning; (C) the symptoms do not meet the criteria for another mental disorder nor are they an exacerbation of an existing mental disorder; (D) the symptoms do not represent normal bereavement; and (E) the symptoms do not persist longer than six months after the stressor or its consequences are terminated (APA, 2013). The DSM-5 groups AjD in the category of *Trauma- and Stressor-Related Disorders*, which is the response to some of the critique that was raised towards the earlier classification of AjD. The Trauma- and Stressor-Related Disorders group in DSM-5 emphasize that these disorders share the exposure to a stressful or traumatic event as diagnostic criterion and detach these disorders from an anxiety- or fear-based context (APA, 2013; Friedman et al., 2011).

For a long time, adjustment disorder was neglected in clinical psychology due to the unclear symptom definition and the resulting large overlap with other mental disorders (e.g. Strain & Diefenbacher, 2008). As a result, AjD was mainly used to describe sub-threshold conditions of the major affective and anxiety disorders (Strain & Diefenbacher, 2008). Even though this flexible use proved the high clinical utility of AjD, clinicians rated the ease of use and goodness of fit of AjD in day to day practice very low (Evans et al., 2013; Reed et al., 2011) and AjD

was referred to as “waste basket” diagnosis (Fabrega & Mezzich, 1987). It is unclear, how AjD can be distinguished from a normal stress response (Casey & Jabbar, 2013), from other sub-threshold disorders, such as depressive disorder, not otherwise specified (Zimmermann, Martinez, Dalrymple, Chelminski & Young, 2013), or from other psychiatric disorders, such as major depressive episode (Casey et al., 2006; Doherty, Jabbar, Kelly & Casey, 2014). This lack of specificity of the AjD diagnosis led to a lack of appropriate assessment instruments (Strain & Diefenbacher, 2008), which in turn led to a lack of research on AjD (Baumeister & Kufner, 2009), and a preference for research on affective disorders (Casey & Bailey, 2011). Only around 50 publications in peer-reviewed journal that specifically address AjD were published before 2007, the year in which a new proposal for AjD was introduced. As a result of the fuzzy criteria, the heterogenous clinical presentations, and the lack of research, appropriate treatment options for patients with AjD are scarce. To some extent, it is even unclear whether these patients are in need for active treatment, such as psycho- or pharmacotherapy, or less invasive interventions, such as monitoring or psychoeducation (Baumeister, Maercker, & Casey, 2009).

During the revision of the ICD and the DSM, this critique was subject to the discussion about new diagnostic criteria. The DSM-5 did not include a description of AjD that could counteract some of the critique on the grounds of limited research in the field (Friedman et al., 2011). The upcoming ICD-11, however, will incorporate a new definition of symptoms of AjD and classify it as *Disorder Specifically Associated with Stress* (Maercker et al., 2013). This new diagnostic category will be introduced in the following chapter.

3. The Proposal for ICD-11: Disorders Specifically Associated with Stress

In preparation for the forthcoming 11th revision of the ICD, the International Advisory Group for the Revision of ICD-10 Mental and Behavioural Disorders installed a Working Group on the Classification of Disorders Specifically Associated with Stress (Maercker et al., 2013). The Disorders Specifically Associated with Stress category is supposed to represent conditions, in which the exposure to a stressful event serves as necessary diagnostic criterion, and that have distinct psychopathology (Maercker et al., 2013). Currently, posttraumatic stress disorder (PTSD), complex posttraumatic stress disorder (CPTSD), prolonged grief disorder (PGD), AjD, reactive attachment disorder, and disinhibited social engagement disorder are proposed as disorders constituting this category (Maercker et al., 2013). Reactive attachment disorder and disinhibited social engagement disorder are disorders predominant in childhood and adolescence (Rutter & Uher, 2012) and are not followed up in any way in the present thesis. The current state of research regarding PTSD, CPTSD, PGD, and AjD as diagnosis in ICD-11 will be outlined in the following to provide a better understanding of the new nosological approach to AjD. First, the current proposals for the description in ICD-11 will be presented and a short overview over the DSM-5 criteria will be given. Second, the current debates in the validation process for each disorder and their relevance for AjD will be outlined.

3.1. Posttraumatic Stress Disorder and Complex Posttraumatic Stress Disorder in ICD-11

The WHO work group on Disorders Specifically Associated with Stress proposed the inclusion of PTSD and CPTSD in ICD-11. PTSD is thereby characterised by the development of symptoms of 1) re-experiencing, 2) avoidance of thoughts, memories, activities, situations or people, and 3) persistent perceptions of heightened current threat after the exposure to an

extremely threatening or horrific event or a series of such events (Maercker et al., 2013; WHO, 2018). Complex PTSD is characterised by the same symptoms plus three symptoms of disturbances in self-organization (DSO), namely 4) problems in affect regulation, 5) negative self-concept, and 6) difficulties in close relationships (Maercker et al., 2013; WHO, 2018). It is assumed that CPTSD most commonly occurs after prolonged or repetitive events, from which escape is difficult or impossible (e.g. torture, domestic violence, childhood abuse; WHO, 2018).

The concept of CPTSD evolved around research regarding the ICD-10 diagnosis of "enduring personality change after catastrophic experience" and "disorders of extreme stress, not otherwise specified" of DSM-IV. The DSM-5 did not take on the distinction between PTSD and CPTSD. Rather, the diagnosis of PTSD in DSM-5 is made if the symptoms of intrusion, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity occur in the aftermath of exposure to a traumatic event (APA, 2013). Consequently, we are faced with large differences between the ICD-11 and DSM-5 concepts of disorders related to traumatic experiences, which is one of the main focuses of current research.

Several confirmatory factor analyses (CFA) supported the three factors for ICD-11 PTSD and the additional DSO symptoms for ICD-11 CPTSD (cf. a review Brewin et al., 2017; Kazlauskas, Gegieckaite, Hyland, Zelviene, & Cloitre, 2018). A number of studies also supported the differentiation between PTSD and CPTSD through latent class analysis (LCA) and latent profile analysis (LPA). In most of these analyses at least two qualitatively differing classes emerged: one characterised by high endorsement of PTSD but low endorsement of DSO symptoms and one characterised by high endorsement of both PTSD and DSO symptoms (cf. a review Brewin et al., 2017; Ben-Ezra et al., 2018; Hyland et al., 2018; Kazlauskas et al., 2018). As a third approach, network analytical findings were also in support of the proposed structure of PTSD and CPTSD (cf. a review Brewin et al., 2017). LPA and network analysis further supported the differentiation between CPTSD and borderline personality disorder

(Cloitre, Garvert, Weiss, Carlson, & Bryant, 2014; Knefel, Tran, & Lueger-Schuster, 2016). Prevalence rates for ICD-11 PTSD were consistently lower compared to the DSM-5 definition (cf. a review Brewin et al., 2017; Wisco et al., 2017; Shevlin et al., 2018; Powers et al., 2017).

To sum up, the main focus of research regarding PTSD and CPTSD are the symptom structure of the disorders, associations with other disorders and comorbidity, and differences between ICD-11 and DSM-5. In particular, the different statistical approaches towards the validation of the new concepts can stimulate research on AjD. The following chapter will highlight the discussion around the newly defined diagnosis of PGD.

3.2. Prolonged Grief Disorder in ICD-11

Bereavement as precursor for stress-related psychopathology has been discussed for several years and there is some controversy around the conceptualisation of pathologic bereavement reactions (cf. Killikelly & Maercker, 2018). In the past, individuals who suffered from a severe grief reaction would have been classified as cases of adjustment disorder, of depression, or of PTSD (Shaer et al., 2011). However, several authors have claimed that bereavement related disorders have a distinct psychopathology and introduced the terms “complicated grief” (Horowitz, 1986), “traumatic grief” (Prigerson et al., 1999), and “prolonged grief” (Prigerson et al., 2009). These concepts emphasize different aspects of pathological bereavement reactions, such as unusual presenting of bereavement, bereavement that is similar to trauma reactions, or a prolonged response to the death of a loved one.

The ICD-11 will include the diagnosis of prolonged grief disorder, which can occur following the death of a partner, parent, child or other close individuals (WHO, 2018). The current description includes 1) longing for the deceased or persistent preoccupation with the deceased and 2) intense emotional pain, e.g. expressed by sadness, anger, guilt, difficulties accepting the death, emotional numbness or social withdrawal (Maercker et al., 2013; WHO,

2018). This response persists for an atypically long period of time that exceeds social, cultural or religious norms of the individual's context and it causes significant impairment in important areas of functioning (WHO, 2018).

The DSM-5 on the other hand refrained from including a bereavement related disorder in the main part. In preparation of DSM-5 it was discussed to include dysfunctional bereavement as a subtype of AjD called "adjustment disorder related to bereavement" (cf. Boelen & Prigerson, 2012). This condition was supposed to reflect that an intense and extended bereavement is a specific subtype of the adjustment reaction. Ultimately, the DSM-5 introduced the persistent complex bereavement disorder in the appendix as condition for further study (APA, 2013). It can be seen as a compromise between a prolonged grief reaction and a complex presentation of symptoms as described by the term "complicated grief" (Killikelly & Maercker, 2018).

The prevalence of PGD according to ICD-11 criteria among a community-based bereaved sample was 12.7%. A diagnosis of PGD 6 months after the loss of a loved one was predictive for suicidal ideation (RR = 5.04), functional impairment (RR = 2.07), and low quality of life (RR = 3.23) at 12 – 24 months (Maciejewski, Maercker, Boelen, & Prigerson, 2016). The prevalence rates and specificity values of PGD after ICD-11 and persistent complex bereavement disorder after DSM-5 were largely similar (Maciejewski et al., 2016). Validation studies of PGD mainly focused on the consensus criteria that were introduced in preparation for ICD-11 and DSM-5 (Prigerson et al., 2009; cf. an overview Killikelly & Maercker, 2018). One focus in the validation of the PGD diagnosis is the differentiation between PGD and depressive disorders as the loss of a significant other can also be a risk factor for the development of depression. A study examining grief and depression amongst a sample who experienced the loss of a loved one due to unnatural causes (N = 245) identified three qualitatively different latent classes: a resilient class with overall low probability of symptom

endorsement, a PGD class, and a PGD/depression class (Boelen, Reijntjes, Djelantik, & Smid, 2013). Negative cognitions about the self discriminated between the combined PGD/depression class from the other two classes (Boelen et al., 2016). The finding that PGD and depressive symptoms are distinguishable was confirmed by another study that used a CFA approach (Boelen, van de Schoot, van den Hout, de Keijser & van den Bout, 2010). Results from a network analysis for the symptoms of persistent complex bereavement disorder revealed that emotional pain, yearning for the deceased, a feeling of emptiness, and preoccupation with the deceased were central characteristics in the network (Robinaugh, LeBlanc, Vuletich, & McNally, 2017), which could be interpreted as indirectly confirming the validity of the ICD-11 approach (Killikelly & Maercker, 2018).

The definition of PGD specifically includes that grief reactions can vary across social, cultural and religious contexts; thus, the cross-cultural applicability of the concept is an important issue within the validation of the ICD-11 PGD definition (Killikelly & Maercker, 2018). Several studies investigated measures for grief reactions in different cultures (Killikelly & Maercker, 2018) and one study found similarities in grief reactions in bereaved parents between Switzerland and China (Xiu et al., 2016). However, a systematic investigation of the cross-cultural applicability of the diagnosis is still pending.

Overall, the main areas of interest around PGD are the definition of diagnostic criteria, the differentiation between PGD and depressive symptomatology, and the cross-cultural applicability of the PGD concept. The discussion around the conceptualisation of disordered bereavement is particularly interesting for AjD since PGD could be seen as a spin-off of this disorder. The next chapter will introduce the new conceptualisation of AjD that is proposed to replace the deficient definition in ICD-10 (see Chapter 2.1.).

3.3. Adjustment Disorder in ICD-11

To counteract some of the critique towards AjD (see Chapter 2.1.) Maercker, Einsle, and Köllner (2007) introduced a new diagnostic concept for AjD that is based on the general assumptions of the theory of stress-response syndromes (Horowitz, 1986, 2011; see Chapter 4.1). They introduced intrusions, avoidance, and failure to adapt as core symptoms of AjD, which was inspired by Horowitz (1986) and the PTSD definition. Furthermore, the distinction of subtypes as in ICD-10 was maintained. During the revision of the ICD, this concept was adopted and specified. The current description of AjD for ICD-11 includes 1) AjD is a maladaptive reaction to a single or multiple stressors emerging within one month; 2) symptoms of preoccupation with the stressor or its consequences; 3) symptoms of failure to adapt to the stressor; 4) significant impairment in important areas of functioning; and 5) the symptoms do not meet the criteria for another mental disorder and typically resolve within 6 months (Maercker et al., 2013; WHO, 2018). This is the first time that AjD will include a positive symptom definition. Preoccupation with the stressor or its consequences includes excessive worry, recurrent and distressing thoughts about the event, or constant rumination about its consequences (WHO, 2018). Failure to adapt refers to a more generalized stress-response that may result if the event is not successfully processed (Maercker et al., 2007) and is currently described by symptoms of sleep disturbance, concentration problems, or withdrawal from activities (Einsle, Köllner, Dannemann, & Maercker, 2010; Glaesmer et al., 2015). Compared to the definition of AjD in DSM-5 as outlined earlier (Chapter 2.1.), there is yet another time a large difference in the approach between ICD-11 and DSM-5.

The ICD-11 approach has found empirical support in several studies that are described in the background and methods of Paper 1, Paper 2, and Paper 3 (see Chapter 8). Studies mainly focused on the selection of symptoms for the description of AjD (e.g,, Einsle et al., 2010; Maercker et al., 2007;), the latent structure of possible AjD symptoms (e.g. Glaesmer et al.,

2015; Zelviene, Kazlauskas, Eimontas, & Maercker, 2017), the internal consistency, reliability and cut-off scores of the newly developed scale (e.g. Bley, Einsle, Maercker, Weidner, & Jorarschky, 2008; Lorenz, Bachem, & Maercker, 2016), discriminant and concurrent validity of the AjD formulation (e.g. Bley et al., 2008; Einsle et al., 2010), and clinical utility of the concept (Bachem, Perkonigg, Stein, & Maercker, 2016).

This overview of the specific changes to ICD-11 in the Disorders Specifically Associated with Stress category intended to generate a clearer picture of the new approach to AjD. All three diagnosis find their roots in Horowitz' (1986) conceptualisation of stress-response syndromes. They share characteristics of cognitive and emotional impairments that further result in behavioural changes after the experience of critical life events. PGD and AjD specifically share the recurring distressing thoughts of the experience. The PGD definition, however, much clearer delineates the emotional reaction (sadness, anger, guilt) and is characterised by the state of longing for the deceased. In AjD, the emotional and behavioural reactions are less clearly defined, which is most likely the result of the various events that can trigger this disorder. The PTSD definition, in contrast to AjD, is characterised by a much more fundamental distortion of self as life events precipitating this disorder typically threaten the physical and psychological integrity of an individual more dramatically. The symptoms of a PTSD can to some extent be seen as the substantial exacerbation of the AjD symptomatology that is located at the lower end of the psychopathology spectrum. The nosological grouping of these disorders in one category allows to understand stress reactions within one underlying framework.

Part of the validation process of the ICD-11 was a case-controlled field study with mental health professionals around the world (Keeley et al., 2015). A total of 1738 mental health professionals representing 76 different nationalities participated in an online vignette-based study. They were presented with eleven case vignettes representing cases of PTSD, CPTSD,

PGD, AjD, other disorders specifically associated with stress, and no diagnosis. The mental health professionals were asked to provide a diagnostic decision and to answer specific questions about essential features, clinical utility and diagnostic guidelines. In general, the ICD-11 diagnostic guidelines for disorders specifically associated with stress were found to be applicable and improved diagnostic decisions (Keeley et al., 2015). Clinicians were able to differentiate between CPTSD and PTSD, between AjD and PTSD, and to identify PGD and AjD. Some difficulties occurred regarding the identification of re-experiencing symptoms in PTSD, the inclusion of functional impairment in PTSD and AjD, and the differentiation between PGD and normal bereavement. Furthermore, diagnosis was often made based on the nature of the stressor rather than on the specific symptom definition. This contrasts the intent of the ICD-11 workgroup on disorders specifically associated with stress to emphasize the symptom presentation and to not distinguish between the disorders based on the nature of the stressor (Keeley et al., 2015). Based on the findings of the field study, changes to the proposals for disorders specifically associated with stress were made and the current proposals presented in this thesis were installed. These findings again highlight the important controversies in the validation of each diagnosis. It can be expected that with the acceptance of the changes for ICD-11 by the World Health Assembly in 2018 and the systematic application in research and practice, further implications of the new definitions become evident. The next chapter will discuss theoretical models for the development and maintenance of AjD.

4. Theoretical Models for Adjustment Disorder as Disorder Specifically Associated with Stress

There is only limited literature on aetiological models for AjD or models that describe the development and maintanance of this disorder. The new nosological grouping of AjD in the category of disorders specifically associated with stress allows looking at specific models that can explain symptom formation. Especially the vast literature on the development of PTSD can help to formulate assumptions for AjD. In the following chapter, three different psychological approaches towards disorders specifically associated with stress will be outlined. Besides the theory of stress-response syndromes that specifically includes AjD (Horowitz, 1986, 2011), a cognitive (Ehlers & Clark, 2000) and a socio-interpersonal (Maercker & Horn, 2012) approach from the PTSD literature and their applicability to AjD will be discussed. The chapter concludes with a look at biological approaches in AjD research. Each description of the models includes a short outlook on implications for treatment of AjD and an evaluation of their advantages and shortcomings.

4.1. Stress-Response Syndromes (Horowitz, 1986)

The definition of PTSD, CPTSD, PGD, and AjD as disorders specifically associated with stress can be theoretically grounded on the formulation of stress-response syndromes by Horowitz (1986, 2011). According to the theory, individuals follow three motives after the experience of a life event: to understand stimuli and responses, to restore personal safety, and to regulate emotional arousal (Horowitz, 2011). Most people thereby go through several phases of response (see Figure 1). These phasic responses can be functional and help the individual to

integrate the experience in his/her life. However, they can also be exaggerated and dysfunctional, and result in the development of psychopathology.

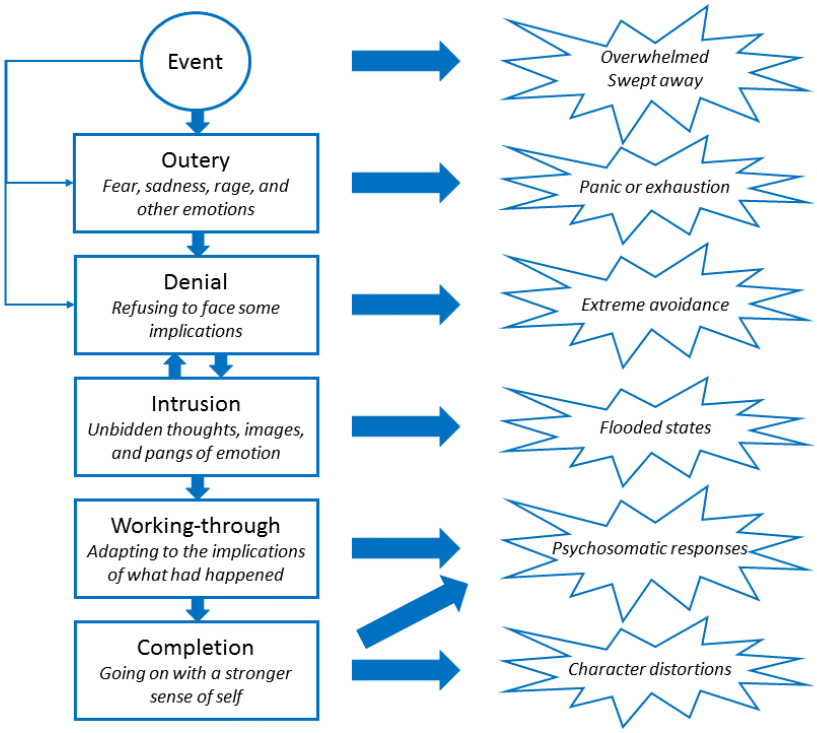


Figure 1: *Phases of Response after a Stressful Life Event (left) and Examples of their Exaggeration (right) according to Horowitz (2011)*

Horowitz (2011) distinguished between avoidant, intrusive, and hyperarousal states that are accompanied by different symptomatology. These symptoms are present in the areas of perception and attention, consciousness of ideas and feelings related to the event, information processing, emotions, and action patterns. For example, preoccupation with event-related themes can be understood as a symptom of an intrusive state of information processing. Errors in information processing may lead to an overgeneralization of stimuli and thus lead to recurring distressing thoughts. Furthermore, sleep disturbances as part of the failure to adapt symptomatology in AjD could be a result of the avoidance of emotions or of hyperarousal regarding feelings related to the event. As can be seen by these examples, each AjD symptom

can be the result of multiple mechanisms described in the theory. Importantly, Horowitz (2011) recognises individual differences in the experience of life events, their vulnerabilities, their resources, and their resilience, which helps to understand the difference in responses to stressor events. The treatment of stress-response syndromes should help to reach the individual's aims of understanding stimuli and response, restoring personal safety, and regulate emotional arousal. Exposition to details of the event might increase functional information processing and decrease recurring thoughts. Overgeneralization could be addressed through the extinction of the associations between stimuli and response. Like in these examples, the rationale for specific interventions is grounded on the assumptions about development and maintenance of each symptom (Horowitz, 2011).

The theory of stress response syndromes by Horowitz (1986) was the first to formulate a theory of symptom development in AjD. Horowitz' work integrates theoretical assumptions, clinical observations, and empirical findings, it helps to understand the psychopathology of AjD, and it proposes a rationale for treatment. The concept of phasic responses after a stressful life event describes several symptoms that are commonly observed in AjD. However, it has never been systematically investigated and a strict allocation of phases and exaggerated responses might be questionable. Overall, the theory of stress-response syndromes by Horowitz (1986, 2011) is a useful work to understand AjD as a stress related disorder and provides, despite its shortcomings, useful assumptions for the aetiology of this disorder.

4.2. Cognitive Model (Ehlers & Clark, 2000)

Another model that can explain the development of symptoms of an AjD is the cognitive model from Ehlers & Clark (2000). In the context of PTSD, they proposed that individual differences in the appraisal of the event and in the nature of the memory for the event contribute to a sense of current threat. Typical appraisals that are maladaptive are appraising the event as

solely negative, overgeneralisation of experiences to other events, and negative interpretation of emotional responses to the event. The memory of the event might be distorted and not fully integrated into other autobiographical memories. Taken together, both maladaptive appraisals and the altered memory function can lead to selective retrieval of certain aspects of the event and a sense of current threat. The perception of ongoing threat leads to several symptoms of re-experiencing, arousal, anxiety and other emotional responses (Ehlers & Clark, 2000). For the treatment of trauma reactions, the model implies that the memory of the event needs to be integrated into autobiographical memories, problematic appraisals of the event or its consequences need to be altered, and dysfunctional coping strategies need to be dropped or changed (Ehlers & Clark, 2000).

The assumptions of the cognitive model by Ehlers & Clark (2000) can explain preoccupation with the stressor as a result of maladaptive appraisals of the event and disrupted memories. Failure to adapt symptoms can be explained through the assumption of an ongoing perception of threat, which is accompanied by an ongoing arousal state. In the long term, elevated arousal produces an exaggerated stress-response, which is represented by failure to adapt in the AjD definition. The model proposes detailed assumptions about the maintenance and treatment of symptoms, which creates the opportunity to empirically test and clinically observe key mechanisms of the disorder. However, the model does not allow to draw specific assumptions about mechanisms behind aetiological and risk factors as it mostly focuses on peri- and posttraumatic processes. Furthermore, this model was proposed for PTSD and there are quantitative and qualitative differences to AjD. Considering the typically less severe nature of precipitating life events in AjD, it can be assumed that the changes in appraisals of events and that the memory distortion might be less far-reaching. Even though the consistent support for preoccupation with the stressor as core symptom of AjD supports the hypothesis of altered cognitive states in AjD, a comprehensive investigation of the extent of cognitive changes in

AjD is still pending. In the same way, the implications for treatment and effective treatment approaches that derive from the theory have to be subject of future investigation. Overall, the cognitive model by Ehlers & Clark (2000) creates the opportunity to derive useful assumptions about the nature of the disorder and should be kept in mind for further investigation of AjD.

4.3. The Socio-Interpersonal Framework Model (Maercker & Horn, 2012)

One further model that can facilitate the investigation of the aetiology of AjD is the socio-interpersonal framework model by Maercker & Horn (2012). The model emphasizes that every individual is nested in different levels of social context, which influence the development of symptomatology after stressful life events. The authors describe three different levels of social context: the individual level, the level of close relationships, and the distant social level. Figure 2 depicts a simplified representation of the model that emphasizes the contextual view. The individual level represents affective reactions that relate to the social environment and that are relevant for the individual processing of stressful life events, i.e. social-affective phenomena (e.g. shame, anger). The level of close relationship emphasizes processes that occur when an affected individual interacts with significant others (e.g. social support, negative social exchanges). The distant social level reflects cultural and societal influences that may facilitate or hinder recovery from stressful life events (e.g. values, societal acknowledgement as a victim). The model assumes that an individual is embedded in these different contexts and that the relationship between the individual and the contexts is reciprocal (Maercker & Horn, 2012). As implications for treatment, the authors outline that chances for treatment success should be elevated if social contexts, such as romantic partners or other significant others, are included. Community-based interventions as well as structures that specifically include the social environment of an individual are further implications of the socio-interpersonal framework model (Maercker & Horn, 2012; Maercker & Hecker, 2016).

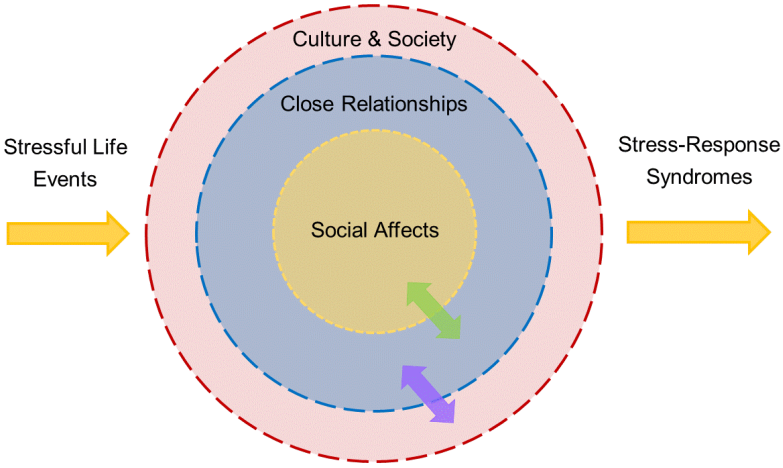


Figure 2: *Simplified Socio-Interpersonal Framework Model, adapted from Maercker & Hecker (2016)*

This framework was originally proposed for PTSD but could be applicable to other stress-response syndromes. The introduction of Paper 2 and Paper 3 discuss evidence that supports the contextual view of the socio-interpersonal framework model in the context of AjD (see Chapter 8). The general idea that social, contextual, and interactive processes should complement the traditional individualistic perspective built the basis for assumptions about characteristics associated with AjD in the present thesis. The authors specifically state that this model complements the traditional, individual-centered view of previous models and extends them by components of the social reality of an individual (Maercker & Horn, 2012; Maercker & Hecker, 2016). The assumptions of previous models and intrapersonal features (e.g. cognitive appraisal, self-efficacy, or emotion regulation) could hence be integrated into the individual level of the model. This integrated model was subject to investigation of Paper 2 (see Chapter 8) and found initial empirical support for AjD after involuntary job loss.

The socio-interpersonal framework model allows integrating findings on different chracteristics that are associated with the development of a disorder after the experience of a stressful life event into one comprehensive theory. It relates to previously well researched social

processes and thereby expands individual centred perspectives. The authors further propose ideas for investigating the validity of the model, such as the use of dyad research or microanalytical momentary assessment (Maercker & Horn, 2012). However, the assumptions of the model mostly refer to general levels of the social embeddedness and not specific factors. This means that the model cannot be empirically investigated as a whole but rather provide a structure for the investigation of specific factors associated with disorder development and maintenance. This in turn allows to flexibly adapt the model to specific syndromes (e.g. PTSD, PGD, AjD) and contexts (e.g. rape victims, suicide survivors, individuals affected by job loss) on the grounds of pathognomic theory and evidence. Overall, the socio-interpersonal framework model was a useful tool to derive assumptions about predictive factors for AjD in the present thesis.

4.4. Biological Approaches

It is important to consider biological correlates that might be associated with the development of stress-response syndromes. Horowitz (2011) discussed findings of hormonal changes, such as excessive cortisol release, changes in oxytocin, and telomere shortenings, genetic predispositions, and other biological factors, such as post-concussion structural and functional changes, that may account for specific symptoms in trauma victims. Strain and Friedman (2011) proposed to build up on work about the role of the physiological stress response in PTSD, depression, and anxiety and to include this perspective into the understanding of AjD as a disorder associated with stress. Especially the hypothalamic-pituary-adrenal (HPA) axis in the human stress response can help to understand the development of symptoms in response to psychosocial stress (Selye, 1956). In case of stress, the HPA and the sympatho-adreno-medullar system (SAM) provoke a release of adrenalin, noradrenalin, and cortisol in the adrenal gland. Through this endocrine stress-response, an organism tries to regain

homeostasis, i.e. physiological balance. This adjustment process is called allostasis (McEwen, 1998). According to this understanding, symptoms increase as a result of an increase in allostatic load (Selye, 1956), which can be the result of multiple stressors or ongoing stress. Stress-induced alterations in HPA function together with an imbalance between arousal and inhibitory processes could be an underlying physiological mechanism in AjD, but has not been subject to systematic research yet (Bachem & Casey, 2017; Strain & Friedman, 2011). Two studies investigating suicidal behaviour in AjD patients found higher levels of plasma cortisol in patients compared to healthy controls (Tripodianakis, Markianos, Sarantidis, & Leotsakou, 2000) and no differences in cortisol levels between patients with AjD and major depressive disorder (Lindquist, Träskman-Bendz, & Vang, 2008). Another study found that patients with AjD symptoms as a response to mobbing in the workplace presented higher serum levels of nitrosylated and carbonylated proteins compared to healthy controls (Di Rosa et al., 2009). These proteins are associated with the physiological stress-response and can in high concentration compromise the homeostatic mechanisms in the human stress-response (Di Rosa et al., 2009). However, the results are based on old AjD criteria and focus on a very specific subpopulation with AjD, thus need to be replicated within the new framework and in other populations.

Newer studies have investigated functional and structural changes in brain activity of individuals diagnosed with AjD. Myung and colleagues (2016) found a decreased gray matter volume in the right medial frontal gyrus of AjD patients compared to healthy controls. The right medial frontal gyrus is part of the default mode network that has been associated with maladaptive and depressive rumination (Hamilton et al., 2011), which could be an underlying mechanism of the development of emotional dysregulation in AjD (Myung et al., 2016). Lower regional homogeneity (an indicator of regional synchrony of activation in the brain) in the left posterior cerebellar lobe, bilateral medial orbitofrontal cortex, bilateral caudate, and left middle

temporal gyrus, and increased regional homogeneity in the bilateral posterior cingulate gyrus / precuneus were found in patients with AjD compared to healthy controls (Li et al., 2017). Moreover, this study found a decreased functional connectivity between the left posterior cerebellar lobe and the bilateral supplementary motor area (Li et al., 2017). According to the authors, these functional deficits could explain the decreased self-recognition, memory dysfunctions, cognitive and emotional impairments, and high alertness of individuals affected by AjD. However, these findings again are based on an old definition of the disorder and focus on a specific subgroup of young military recruits. They should thus be interpreted with caution but might stimulate further research on neuro-developmental correlates of AjD.

Taken together, the current state of theory and research on biological mechanisms in AjD is still sparse. Some assumptions of the underlying biology can be drawn from our understanding of related mental disorders, such as PTSD or depression, and first studies investigating biological correlates of AjD shed light into hormonal and neuro-developmental correlates. Currently, a large proportion of individuals with AjD receive a pharmacological treatment despite a lack of evidence for their effectiveness (Bachem & Casey, 2017). A better understanding of biological changes in AjD might facilitate the construction of more appropriate, targeted treatment options for AjD.

5. The Context of Job Loss

In order to understand the impact of critical life events, it can be crucial to look at their timing within the life span (Filipp, 1999). During middle adulthood, people have the highest amount of responsibilities in life. Stressful life events or trauma can severely disturb those responsibilities. For that reason, Thompson, Norris, and Hanacek (1993) assume that the psychological impairment in the aftermath of a stressful life event or trauma is highest for middle-aged adults. Developmental tasks in middle adulthood deal primarily with maintenance and consolidation of resources (Heckhausen, Dixon, & Baltes, 1989). One of the central developmental tasks is finding a profession, getting a job and maintaining it (Havighurst, 1956). People settle on a career path at around 29 years of age and have career peaks at around 40 (Settersten & Hagestad, 2005). The loss of the job hence threatens basic goals of an individual's life.

Early theories of the consequences of job loss that have their roots in occupational or health psychology mainly focus on the appraisal of the dismissal and the coping strategies that an individual utilises. Leana and Feldman (1988) were among the firsts to introduce a comprehensive model of coping with job loss. Their model assumes that in a first instance after job loss the cognitive appraisal and emotional arousal of the individual determine the coping strategies. This is moderated by situational and personality factors. The coping strategies in turn influence future job attainment, which then determines the outcomes of job loss, such as job attitudes, general health and quality of relationships. Latack, Kinicki, and Prussia (1995) focus on the coping process in particular and propose a basic cybernetic control model. They state that following a job loss, an individual compares his or her status to a referent goal based on economic, psychological, physiological, and social aspects. The discrepancy between the

current state and the reference state results in a perception of harm, loss, or threat, which defines the coping goals. The coping goals in turn determine the coping strategies, which can be control oriented or escape oriented. The individual's coping efficacy and the coping resources moderate this process. The coping strategies reduce the initial discrepancies by the adjustment of a goal or standard (e.g. downsizing the house), behavioural changes (e.g. proactively mobilising social resources on the job market), or the cognitive revision of goals or standards (e.g. shifting priorities from career to family matters). This feedbacks into the job loss comparison, so that this process loops until there are no more discrepancies. Gowan and Gatewood's (1997) theory contains and simplifies parts of both models. They propose that after involuntary job loss coping resources determine the appraisal of the situation as well as the coping strategies, which can be problem-focused, symptom-focused, or emotion-focused. The coping strategies then influence the affect of the individual and have impact on the reemployment status. The affect and reemployment status determine the long-term outcome of involuntary job loss, such as psychological, social, and physiological well-being.

While these models incorporate important mechanisms that can help to determine individual outcomes after job loss, they have several shortcomings. Particularly the definition of outcomes is flawed. In Leana and Feldman's (1988) model job attainment is the only factor that is directly connected to the outcome, which means that the re-employment status is the sole predictor of the effects of job loss. Even though Gowan and Gatewood (1997) extend this assumption and include the affect as a determinant of long-term outcome, they only include distress and state that the affect is uniquely determined by the coping strategies. Latack and colleagues (1995) do not even define long-term outcomes of job loss, but only include a loop to economic, psychological, physiological, and social discrepancies that are the result of a social or normative comparison. Most likely as a result of the occupational psychology focus, these models can only explain some of the reactions to job loss and even perhaps put an unnecessary focus on

job- and re-employment-related aspects to explain general outcomes, such as health and well-being. The understanding of stress responses from a clinical psychological perspective might be able to explain these more distant outcomes of job loss.

Assuming that job loss threatens basic individual needs and goals as mentioned before, job loss can easily result in the development of psychopathology, such as depression, anxiety, or adjustment disorder. Studies identified worse general mental health (Ziersch, Baum, Woodman, Newman, & Jolley, 2014), more depressive symptoms (Brand, Levy, & Gallo, 2008; Paul & Moser, 2009; Riumallo-Herl, Basu, Stuckler, Courtin, & Avendano, 2014), and an increased risk of the development of a mental disorder (Barbaglia, ten Have, Dorsselaer, Alonso, & de Graaf, 2014). Suicidality is another outcome that is frequent in the context of job loss (Nordt et al., 2015; Milner et al., 2014). Physical health outcomes that were reported include an increased risk of cardiovascular failures (Gallo et al., 2004), increased smoking (Falba, Teng, Sindelar, & Gallo, 2005; Golden & Perreira, 2015), increased alcohol consumption (Eliasen & Storrie, 2009; Gallo, Bradley, Siegel, & Kasl, 2001), and decreased work ability (Maier et al., 2006). Meta-analyses for the decline in health after job loss identified effect sizes ranging from d = .36 - .54 (McKee-Ryan et al., 2005; Murphy & Athanasou, 1999; Paul & Moser, 2009).

Clearly, these findings indicate that involuntary job loss has several negative implications for the health of the affected individual. In December 2017, there were around 146’000 individuals without an employment in Switzerland. This equals 3.3% of the whole working population (State Secretariat for Economic Affairs [SECO], 2018). In 2017, there were differences in unemployment rates between 3.7% (January 2017) and 3.3% (December 2017) with fluctuating rates over 12 months (SECO, 2018). This indicates that a significant proportion of individuals experience the transition to unemployment over the course of one year. Job loss was in 31.1% of the cases (74’000 individuals) the reason for unemployment in the year 2016 (Federal Statistical Office, 2017). The transition into unemployment implies for most

individuals changes in their daily structure, financial strain, and changes in social networks. Changes in daily living conditions create stress and require adjustment. Thus, knowledge about the human stress response and from clinical psychology can extend the occupational psychology approaches to create a deeper understanding of health outcomes after job loss. Adjustment disorder as a disorder specifically associated with stress that describes mental health changes during and after transitional phases in life is a good candidate to further investigate the mental health consequences of job loss. Especially in case of involuntary leave, the impact on psychological well-being might be higher than after voluntary leave (Voss & Chen, 2015). This is why involuntary job loss was chosen as the context of research in the present thesis.

6. The present Thesis

The present thesis was written in a time of change of diagnostic criteria of AjD. The proposal for ICD-11 represented a radical change in disorder definition and facilitated systematic research of the disorder by proposing a specific symptom definition. Therefore, the main aim of the present thesis was to contribute empirical evidence to the newly proposed ICD-11 concept of AjD. Three research questions were formulated:

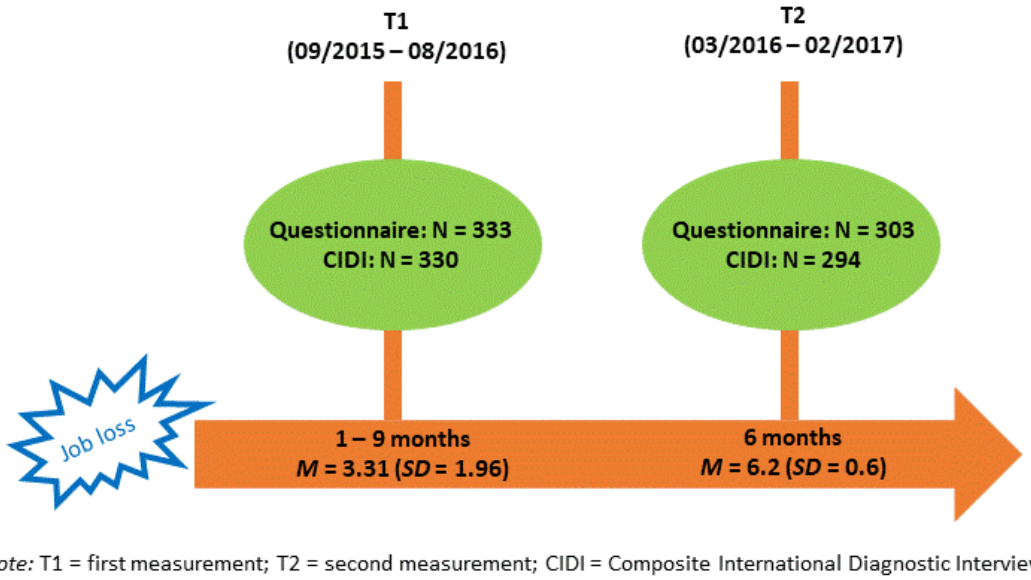
1. What is the appropriate measurement model of the Adjustment Disorder – New Module 20 in the present sample?
2. Which predictive factors for adjustment disorder after involuntary job loss can be identified by the socio-interpersonal framework model for stress-response syndromes?
3. How do AjD symptoms change over time and which characteristics are associated with change?

The following chapter will highlight essential methods of the study and summarize the main findings of the three papers that constitute this cumulative dissertation. The full-length manuscripts can be found in Chapter 8.

6.1. General Study Design

This thesis was written as part of the Zurich Adjustment Disorder Study that aimed at the validation of the ICD-11 concept of AjD. This project was funded by a grant of the Swiss National Science Foundation (#100019_159436/1) and financially supported by the Jacobs Foundation.

The sample consisted of individuals who were affected by involuntary job loss, were aged over 18 years, were fluent in German, and were able to give written informed consent. Participants were recruited in the greater Zurich area through the local job agencies, newspaper articles, and mailing lists from the University. The first assessment took place one to nine months after the last day at work (t1). The study included a longitudinal component and each participant was invited to a follow up interview (t2) six months after t1. A total of N = 333 participants completed the first assessment and *n* = 303 completed the second assessment (Dropout Rate 9.28%). An overview over the study design is given in Figure 3.



Note: T1 = first measurement; T2 = second measurement; CIDI = Composite International Diagnostic Interview.

Figure 3: Study Design of the present Thesis

6.1.1. Outcome Measures

A variety of measures and two means of assessment were used in the current study. The main part was a fully structured clinical diagnostic assessment with the Composite International Diagnostic Interview (CIDI) containing a new module for the assessment of AjD. We used the lifetime version of the CIDI at t1 and a six-months follow up version at t2. The interview was supplemented by a self-report questionnaire battery that assessed a multitude of associated

characteristics. The questionnaires of interest are described in the three papers (see Chapter 8), thus in the following only the two main outcome measures are described briefly.

The Adjustment Disorder – New Module 20 (ADNM-20)

The ADNM-20 is a self-report questionnaire that was specifically designed to investigate a range of possible AjD symptoms for the ICD-11 AjD definition (Einsle et al., 2010). It is comprised of two parts: The first part is a list of possible acute or chronic life stressors, on which individuals indicate which events occurred within the past 2 years. At the end of the list, the individual must indicate which of the event was the personally most distressing one. The following items of the second part are answered regarding the most straining event. This list was integrated into the structured interview (see below), thus not used in questionnaire format in the current study. The second part contains a list of 19 symptoms indicators plus one item that measures functional impairment. The 19 symptom indicators are supposed to reflect the areas of preoccupation with the stressor, failure to adapt, avoidance, depressive symptoms, anxiety reactions, and impulsivity. In the present study, the symptom list was contextualised for the job loss and all individuals were asked to refer to the job loss as index event. Several studies investigated the validity of the questionnaire and found promising results regarding factor structure, reliability, and convergent and discriminant validity. An overview of the current developments in the validation process is integrated in Paper 1 (see Chapter 8.1.).

The Adjustment Disorder Module for the Composite International Diagnostic Interview (AjD-CIDI)

The AjD-CIDI is a newly designed interview section for the Munich Composite Diagnostic Interview. The CIDI is a fully structured clinical diagnostic interview for the assessment of

mental disorders according to ICD-10 and DSM-IV (Wittchen & Pfister, 1997). The AjD module was specifically designed for the purpose of the Zurich Adjustment Disorder Study to assess AjD after ICD-10, ICD-11, and DSM-5 (Perkonigg, Strehle, Lorenz, Maercker, & Beesdo-Baum, 2018). The first part asks for previously experienced life events and for a description of onset and duration for each stressor. If at least one stressor is endorsed, the second part of the module assesses AjD symptoms that occur in response to the subjectively most distressing event. The third part asks for information about onset and recency of symptoms, about different impairments due to the symptoms, and about medical help that has been utilised after the event (Perkonigg, Strehle et al., 2018). A diagnosis of AjD after ICD-11 was given a) if a stressor was present, b) if at least one symptom of preoccupation was endorsed, c) if at least one symptom of failure to adapt was endorsed, d) if the symptoms emerged within one month after the onset of the stressor, and e) if the symptoms were present at least 6-10 times a month and were rated as clinically relevant (based on distress or contact to a health care professional). An initial validation of the AjD-CIDI module found promising results regarding diagnostic validity, test-retest validity, and concurrent validity (Perkonigg, Strehle et al., 2018).

6.2. Summary Paper 1: Dimensionality of Adjustment Disorder

Aim: In the existing literature, different unidimensional and multidimensional models of the latent structure of AjD symptoms were discussed. Therefore, we performed a comprehensive assessment of competing models to determine the dimensionality of the ADNM-20. Furthermore, we examined its concurrent and discriminant validity.

Methods: The analysis for the first paper was based on the baseline data (N = 333) of the ADNM-20, general psychological distress, impairment in social functioning, occupational self-efficacy, and sense of coherence. Using CFA and confirmatory bifactor modelling (CBM), we tested seven alternative models of the ADNM-20 symptom list, including one unidimensional,

three multidimensional, one second-order, and two bifactor models. We computed unique partial correlations between each latent variable of the final model and the manifest criterion variables to assess concurrent and discriminant validity.

Results: A multidimensional model including the factors preoccupation with the stressor, failure to adapt, avoidance, affective reaction, and impulsivity was the best fit of the data amongst the first-order factor models. The second-order factor model exhibited worse fit than the first-order factor models. An unrestricted bifactor model including the five correlated factors from the best fitting first-order factor model plus one general factor evidenced excellent fit with the data across the majority of indices and was deemed the best approximation of the data. The factor loadings of this model pointed towards the dominance of the general AjD factor. The general AjD factor showed a strong positive association with general psychological distress and impairment in social functioning, and a moderate negative association with occupational self-efficacy and sense of coherence.

Discussion: The results of the first paper pointed towards a unidimensional conceptualization of AjD. However, some differential associations of preoccupation with the stressor and failure to adapt occurred after controlling for the general AjD factor (presented in Paper 1, Chapter 8.1.). The associations between AjD and the criterion variables were in the expected direction, pointing towards sufficient discriminatory properties of the ADNM-20.

6.3. Summary Paper 2: A Socio-Interpersonal Approach to Adjustment Disorder

Aim: The aim of the second paper was to identify factors that are associated with the development of AjD symptoms based on assumptions of the socio-interpersonal framework model for stress-response syndromes (Maercker & Horn, 2012).

Methods: The analysis for the second paper were based on the baseline data that were reduced due to multivariate outliers (N = 321). Constructs of interest included AjD diagnostic

status, AjD core symptoms (PRE, FTA, and functional impairment of the ADNM-20), and several intra- and interpersonal variables. We formulated a path model for the association between AjD core symptoms and the predictor variables. Logistic regression analysis investigated associated characteristics of diagnostic status.

Results: The presence of AjD symptoms was directly associated with higher dysfunctional disclosure. General self-efficacy mediated the relationship between loneliness and AjD symptoms, and between reappraisal and AjD symptoms. Both dysfunctional disclosure and loneliness mediated the relationship between social support variables and AjD symptoms. Older age, lower general self-efficacy, higher loneliness, higher dysfunctional disclosure, higher perceived social support, and higher negative support resources were associated with a higher likelihood of meeting the diagnostic criteria for AjD (prevalence = 25.6%).

Discussion: This paper identified characteristics that seem to be relevant for symptom development after involuntary job loss by broadening the scope from demographic and intrapersonal characteristics to the larger social context. In the future, prospective study designs should be applied to advance our knowledge on risk factors in AjD development.

6.4. Summary Paper 3: Latent Change of Adjustment Disorder Symptoms

Aim: AjD is per definition a self-limiting condition that typically resolves within 6 months after the stressor or its consequences are terminated. Only a few studies investigated the course of AjD symptoms over time. The third paper studied the natural course of AjD symptoms over a period of six months.

Methods: The analysis of the third paper was based on $N = 303$ individuals that completed the ADNM-20 at t1 and t2. To identify different patterns of change, we formulated a latent class latent change model. Based on their most likely class membership, we assigned individuals to

groups and applied multinomial logistic regression to identify characteristics associated with group membership.

Results: A three-class solution was deemed the best fitting model. The first class (49.2%) represented individuals with low scores that declined over time. In the second class (35.6%), individuals reported medium symptom severity that also declined over time. The third class (15.2%) was characterized by high symptom severity that showed a small effect of deterioration over time. Higher impairment in social functioning, higher dysfunctional disclosure, lower social acknowledgement, and lower sense of coherence were associated with group membership in the medium to low comparison. Moreover, female gender, older age, first job loss, higher impairment in social functioning, and lower perceived social support were associated with membership in the high group (compared to medium).

Discussion: The three different patterns of change over time were associated with several demographic and psychological characteristics of the individual. Selective prevention could target individuals at high risk and could train specific skills relevant for stress management. Impairment in social functioning was a significant predictor in each comparison, which supports the inclusion of significant impairment as diagnostic criterion for the diagnosis of AjD.

7. General Discussion

The following chapter presents an overall discussion of the relevant backgrounds, results and implications of this PhD thesis. Aspects that have already been addressed in the paper manuscripts that are part of this thesis will not be discussed in detail again but can be found at the end (Chapter 8). The discussion will rather highlight and integrate results from further analysis that have been conducted within the Zurich Adjustment Disorder Study and focus on the applicability of the AjD concept to the context of job loss. The main limitations of the present thesis will be addressed. Then, future directions for AjD will focus on the validation of the diagnosis, and treatment and care of affected individuals. The discussion closes with a general conclusion.

7.1. Empirical Evidence for Adjustment Disorder in ICD-11

The aim of the present thesis was to collect empirical evidence for the ICD-11 conceptualisation of AjD. First, we established a measurement model of our main outcome, the ADNM-20, to ensure the quality of assessment. Second, we transferred the socio-interpersonal framework model for stress response syndromes to AjD and identified characteristics that were associated with the AjD core symptoms and with a diagnosis of AjD. Third, we identified three different patterns of change of AjD symptoms over time.

The ADNM served as one major source for research on the ICD-11 AjD concept. For this purpose the scale was shortened to 19 items and one item reflecting functional impairment was included (Glaesmer et al., 2015; Maercker et al., 2012). Although the new proposal now only includes preoccupation with the stressor and failure to adapt (Maercker et al., 2013), the items still reflect all six symptom areas, which is why the establishment of an optimal

measurement model was essential in the present thesis. Our results pointed towards unidimensionality of the items, indicating that they all reflect one underlying dimension. This implies that a shorter scale could measure AjD with similar precision and future research should focus on the development of a scale that reflects the core symptoms of AjD accurately. Items that were evidencing problems before could be eliminated, e.g. item 3 or item 11 (Glaesmer et al., 2015; Zelviene et al., 2017), and items that reflect preoccupation and failure to adapt could be refined. The results of Paper 1 implied for the subsequent manuscripts that the AjD measure could be adapted for use in further analysis. Paper 2 only reflected on the core symptom items of AjD in order to be able to integrate results from the questionnaire data and the interview data. The use of these 8 items was supported in other studies that focused on a shortening of the scale (Kazlauskas et al., 2018; Zelviene et al., 2017).

A number of psychological variables, such as social support or dysfunctional disclosure, were robustly associated with AjD symptoms in the present data, supporting the assumptions of the socio-interpersonal framework model for stress-response syndromes (see Paper 2, Paper 3). Social support is a resource that may influence the appraisal of stressful events (Lazarus & Folkman, 1984) and thus counteract the development or maintenance of AjD symptoms (Ehlers & Clark, 2000; see Chapter 4.2.). It further might enable self-regulation capacities and strengthen the self-efficacy of an individual (Benight & Bandura, 2004). This was supported by a master thesis that was written in this project. It reported that general self-efficacy mediated the relationship between perceived social support and AjD symptom severity in the present sample (Lerch, 2017). These findings highlight the importance of social support in the context of psychopathology after stressful life events.

Another approach to AjD are biological considerations (see Chapter 4.4.), which were not the main focus of the present thesis. It is assumed that especially failure to adapt symptoms are the result of a generalized stress response. The long-term consequences of the physiological

arousal and a continuing endocrine stress-response can manifest in somatised symptoms (McEwen, 1998). An unpublished master thesis that was part of the present project revealed that individuals who met the diagnostic criteria of an AjD were significantly more likely to experience bodily symptoms, such as nausea or weakness, and that AjD symptom severity mediated the relationship between the amount of life events experienced and the severity of somatisation (Pfluger, 2017). These additional results highlight the importance of physical symptoms in connection with AjD and support biological approaches to disorders specifically associated with stress.

The use of different statistical approaches to investigate the validity of the new AjD diagnosis is most certainly a strength of the present thesis. The focus on measurement models (Paper 1), associated characteristics (Paper 2), and symptom trajectories (Paper 3) was intended to help to depict a comprehensive picture of AjD symptoms after job loss. Two novel ways of data analysis were included in the present thesis: confirmatory bifactor modelling and latent growth mixture modelling. Confirmatory bifactor modelling models uni- and multidimensionality simultaneously and helps to identify the dominant source of covariation (Reise, 2012). Against the background of the uncertainty of the dimensionality of AjD, this allowed us to establish a measurement model of the ADNM-20 in the present sample and to clarify whether the measured symptoms should be treated as indicators of one underlying construct or more. In addition to mainly variable-centred approaches, such as structural equation modelling and regression analysis, we added a person-centred approach to account for individual variability. Especially in longitudinal research, a person-centred approach is useful because it specifically considers the heterogeneity in developmental trajectories (Muthén & Muthén, 2000). We adapted a latent class growth model, which is typically used with at least three measurements (Jung & Wickrama, 2008), to fit for only two points in time (i.e. latent class latent change model). Against the background of uncertain diagnostic thresholds, this allowed

us to group individuals based on their course of symptom severity. In brief, the statistical approaches in the present thesis helped to overcome theoretical and empirical shortcomings and could stimulate future research in this area.

This thesis is the first work that looked at the development of AjD symptoms in the context of involuntary job loss. As described in the background, theoretical and empirical evidence highlight the impact of job loss on health. The transitional period of leaving the post due to dismissal by the employer seems to have several consequences for well-being as can be seen in Paper 2 and Paper 3. Other stressors, such as financial strain or conflicts with family or administration come along with it (Perkonigg, Lorenz, & Maercker, 2018). Financial strain seems to be strongly related to the development of clinical relevant psychopathology, as several objective and subjective indicators of a worse financial situation were associated with the probability of meeting the diagnostic criteria of AjD in the present sample (Perkonigg, Lorenz, & Maercker, 2018). In addition, previous work conditions, such as the type of work being more intellectual and the responsibility in the last position being high, seem to increase the likelihood of meeting diagnostic criteria (Perkonigg, Lorenz, & Maercker, 2018). Higher age was another aspect that was associated with a more severe presentation of AjD symptomatology (Paper 2; Paper 3; Perkonigg, Lorenz, & Maercker, 2018). The younger participants might have seen their job loss as chance for a reorientation in their career (Winefield & Tiggemann, 1989) while the older participants struggle with difficulties on the job market (Spieler, Bruegger, Aerni, Bauer, & Wirz, 2013). In Switzerland, older workers are entitled to longer holidays and more health benefits that result in higher social costs for employers (Spieler et al., 2013). The perception of being “too old and too expensive for the job market” might result in higher symptomatology. Considering all these external factors seems to be relevant not only in the treatment of psychopathology after job loss but also in the counselling of unemployed individuals in job centres. The main service mission of the local job agencies in the canton of Zurich (and

Switzerland in general) is to help the individual finding a new post. If a job counsellor is aware of all these aggravating circumstances, the counselling process could be optimized and periods of unemployment could be shortened.

Most research around job loss focuses on the negative consequences of unemployment, although some studies show that job loss is not always perceived as negative (e.g. De Frank & Ivancevich, 1986; Zikic & Richardson, 2007). Therefore, a master thesis that was part of this project focused on positive changes after job loss. In line with earlier findings, these analyses revealed that job loss did not exclusively have negative implications for the individual well-being (Rütter, 2017). Over two thirds of the participants reported the experience of some positive effect of the job loss, such as the opening of new opportunities or a new appreciation of life. The perception of social support and social acknowledgement in the context of job loss seems to benefit the experience of positive changes or growth (Rütter, 2017). These findings were independent of the presence of psychopathology and could have further implications in the counselling of recently unemployed individuals. Fostering positive consequences and new opportunities could increase the motivation for searching a new job and thus shorten periods of unemployment. Of course, this would require a policy that is open for reorientation and retraining of individuals. Overall, our results suggest that an awareness of the manifold consequences of involuntary job loss and the appropriate training of job counsellors in the national support system might reduce the individual and societal burden that comes with unemployment.

7.2. Limitations of the present Thesis

Several methodological aspects limit the generalizability of the findings from the three papers. The analysis are based on a locally recruited sample that experienced a specific life event. Effects of unemployment could differ between urban areas with many opportunities for

new positions and rural areas with less movement in the labor market. Zurich is the largest city of Switzerland and an area with a high population density. To decrease possible biases due to urbanicity, the recruitement of participants was expanded to the whole canton of Zurich that also includes rural regions. Still, it must be kept in mind that our results should be generalized with caution to the general unemployed population in Switzerland. Furthermore, job loss in a country with a high socio-economic status and high social security might be quite different from job loss in other contexts around the world. Unemployment in Switzerland creates a less existential threat, which could have an attenuating effect on the stress reaction. On the other hand, a successful career is often a status symbol in industrialised countries and could increase negative reactions as it threatens the own identity. Future studies should examine the transition to unemployment in other contexts to broaden our understanding of negative reactions to this adverse life event and the results of the present thesis should be generalized to other populations with caution. Lastly, the present thesis focused on a specific stressor event to investigate the new AjD diagnosis. After job loss, several aspects in life can drastically change and the individual often experiences a need for reorientation, which is representative for the stressor events that the AjD definition refers to. However, the results might display some stressor-specific effects and therefore should be generalized with caution to AjD in general.

A further limitation concerns the methods of assessment in the current project. We used multiple assessment methods for AjD (fully structured interview, self-report questionnaire); however, both are rather newly developed instruments that require further validation. Likewise, other means of assessment could be used to assess interpersonal processes, such as interviews with significant others or observational methods. Future research that extends this work should thus incorporate mixed methodological approaches to broaden the scope of investigation. Last of all, we were not able to collect data before the job loss. This implies that we cannot entirely separate cause and effect in the stress-response process. The longitudinal nature of our study

allows us to draw some conclusions about the direction of the effects. Prospective longitudinal designs could help to identify further predictors of the psychological processing of job loss but would require a large enough time period and financial resources to monitor individuals over a longer time.

7.3. Future Directions: Validation of the Adjustment Disorder Diagnosis in ICD-11

The following two chapters will outline different aspects that could be subject to future developments of AjD. This chapter will discuss the continuing validation of the disorder and integrate the current developments into the guiding principles from the WHO for the development of ICD-11.

When comparing the ICD-11 category Disorders Specifically Associated with Stress and the DSM-5 group of Trauma- and Stress-Related Disorders, it becomes evident that there are substantial discrepancies between diagnostic approaches in all disorders (PTSD, CPTSD, PGD, AjD; cf. Chapter 3). It is therefore essential to be aware of the research in both classification systems and to ultimately compare findings. The DSM-5 rejected the new diagnostic concept for AjD because of a lack of research on the disorder. It was argued that more empirical evidence is a prerequisite for significant changes to the current description (Strain & Friedman, 2011). To date, only one empirical study that specifically focused on the new DSM-5 definition of AjD could be identified (search date: 06.02.2018; search terms: adjustment disorder *AND* DSM-5 in title or abstract). It focused on prevalence, trajectories and subtypes of AjD (O'Donnell et al., 2016). Among Australian injury survivors, the prevalence rate of AjD was 18.9% at three months post injury and 16.3% at twelve months post injury. The diagnosis of AjD three months post injury increased the risk for AjD by five or any psychiatric disorder by two and a half at twelve months. A LPA supported the distinction between three quantitatively different classes (low, medium, high symptom severity) and not a distinction between subtypes

as still used in DSM-5 (O'Donnell et al., 2016). The authors highlight that there were chronic AjD cases as well as fluctuating states of the disorder and that the findings provide some support for the ICD-11 approach (O'Donnell et al., 2016). A direct comparison between DSM-5 and ICD-11 criteria is still pending, but planned within the Zurich Adjustment Disorder Study. Everything considered, there is still great uncertainty in the DSM-5 definition of AjD and it so far did not stimulate further research, thus still obstructing fruitful developments for this disorder. In contrast, research around the ICD-11 definition support the new proposal and allow further insight into maladaptive reactions after stressful life events.

The major aim that the WHO set for the development of ICD-11 was to improve clinical utility (International Advisory Group, 2011; Keeley et al., 2016). Clinical utility becomes evident in a number of aspects, such as the communication about diagnostic entities, the conceptualisation of diagnostic criteria, the implementation of diagnostic concepts, the treatment and management of individuals affected by the disorder, and clinical outcomes (Keeley et al., 2016). The findings of the present thesis mainly support the clinical utility regarding the diagnostic aspects and underline the improved use in a high-risk population of individuals affected by involuntary job loss. A recurring critique towards the old definition of AjD was concerning the boundaries between AjD and non-disorder, and between AjD and other disorders (see Chapter 2.1.). An indication of clinical relevant symptomatology (in contrast to non-pathological states of adjustment to stress) could be the presence of functional impairment arising from the symptoms. The presence of functional impairment due to the symptoms was included as diagnostic criterion in the new AjD formulation (Maercker et al., 2013; WHO, 2018) to overcome difficulties with the identification of clinically relevant symptomatology. As discussed in Paper 1 and Paper 3, the definition and importance of this criterion needs to be addressed in future research and application of the concept.

The omission of subtypes is another change in the definition of AjD that serves the purpose of improved clinical utility. This could reduce the conflation between AjD and other disorders, and produce a clearer delineation of AjD. The symptoms are now defined through the presence of preoccupation and failure to adapt and not by the presence of symptoms of another disorder (such as depressive symptoms in the subtype brief depressive reaction). Studies on the current ICD-11 and DSM-5 criteria support the absence of subtypes in AjD (Glaesmer et al., 2017; Lorenz, Hyland, Maercker, & Ben-Ezra, 2018; O'Donnell et al., 2016). Some of the symptoms that specified the subtypes before could now be represented by the failure to adapt symptom. Failure to adapt includes symptoms that refer to a more generalized stress response but is not further specified by the current ICD-11 description (WHO, 2018). A prolonged stress-response can lead to a multitude of psychological manifestations (cf. Chapter 4.4.) and the specific facets that constitute failure to adapt in AjD should be subject to further research. A clearer description of failure to adapt symptoms can improve the application of AjD in health care settings and thus ameliorate the clinical utility of the condition.

A special characteristic of the ICD-11 disorders specifically associated with stress is the event-relatedness that is part of the diagnostic definition. In ICD-11, PTSD and CPTSD characterize disorders that typically refer to traumatic experiences, PGD defines grief-related symptomatology, and AjD highlights maladaptive reactions to other life events. A main intent of the ICD-11 proceedings was, however, to de-emphasize the nature of the stressor and to stress the symptomatic profile as diagnostic feature (Keeley et al., 2015). A recent meta-analysis found that the association between PTSD symptoms and experienced traumas was stronger than the association between PTSD symptoms and other experienced stressors (Larsen & Pacella, 2016). However, it also confirmed that PTSD symptoms could emerge after non-traumatic stressors, which supports the attempt to de-emphasize the role of the stressor. AjD is discussed as an appropriate diagnosis if the full threshold of PTSD is not met. An abandonment of a clear

distinction between disorders specifically associated with stress based on the stressors and a focus on symptom presentations can benefit clinical utility by a flexible application of the diagnoses in practice. However, a prerequisite for this is an understanding of the distinctiveness of the disorder. Therefore, the role of the nature of the stressor in the development of symptoms should be a focus of future research of disorders specifically associated with stress.

A second main objective of the ICD-11 revisions is international applicability (International Advisory Group, 2011). As in the case of prolonged grief (cf. Chapter 3.2.), it is therefore crucial to investigate the cross-cultural applicability of the AjD concept. Most of the research has been conducted in German speaking and other central European regions (e.g. Glaesmer et al., 2015; Zelviene et al., 2017). Furthermore, two studies found evidence for the applicability of the new AjD diagnostic criteria among oupatients in South Africa (Bachem et al., 2016) and among refugees in Ethiopia, Algeria, Gaza, and Cambodia (Dobricki et al., 2010). Two newer studies investigated the latent structure of AjD and the psychometric properties of the ADNM-20 in Israel and China. In both samples, a unidimensional first-order factor structure for the 19 items of the ADNM-20 was favoured (Lorenz, Hyland et al., 2018; Lorenz, Ho, et al., 2018), again pointing towards unidimensionality of the construct. In the Israeli general population based sample, three quantitatively different latent classes (low, moderate, high) of AjD symptoms emerged using an LPA approach (Lorenz, Hyland et al., 2018), replicating findings from earlier studies (Glaesmer et al., 2015; O'Donnell et al., 2016). In the Chinese university student sample, AjD correlated positively and moderately with depression and anxiety, supporting the discriminant validity of the AjD concept (Lorenz, Ho et al., 2018). The case-vignette study from the WHO included mental health professionals around the world and reported no differences between regions (Keeley et al., 2015). Overall, the results from different cultural backgrounds so far support the international applicability of the concept and future research on the accepted criteria should advance this field.

Ultimately, a diagnostic classification system of mental health issues should always serve the purpose to infer treatment recommendations for individuals affected by a disorder (International Advisory Group, 2011; Keeley et al., 2016). Given the changes in the definition of AjD, it can be expected that specific treatments for AjD will be developed that target the key features of the disorder. Therefore, the second chapter on the future directions will focus on the treatment and care of individuals affected by this disorder.

7.4. Future Directions: Better Acknowledgement of AjD, Improved Treatment and Care Options of Individuals with Adjustment Disorder

As a result of the academic neglect of AjD and the problematic clinical application of the criteria (see Chapter 2.1.), the evidence based treatment and care options of individuals with AjD are limited. One requirement for this would be the better acknowledgement of the disorder in research and practice. The new definition of AjD as one attempt to increase recognition of the disorder and improve diagnostic clarity. However, the mere redefinition of a disorder will not automatically result in improved use and development of novel treatment approaches. One major obstacle is the lack of exchange of knowledge between researchers and practitioners, commonly referred to as the "science-pratice-gap" (cf. Bohus, 2015). Holistic novel models by researchers that do not concur with the eclectic approaches of individual therapists result in a dysfunctional use of diagnosis on both ends and insufficient treatments for the patient. Structural collaborations between science and practice as well as modular approaches for treatment might bridge this gap (Bohus, 2015) and ultimately lead to an improved acknowledgement and care of patients with AjD. The following chapter will begin with the presentation of two interventions that were specifically designed for the ICD-11 conceptualisation of AjD and evaluated in randomized controlled trials. The findings will be

discussed in light of the current lack of treatment models and several directions for care of patients with AjD will be discussed.

Bachem and Maercker (2016b) investigated the effectiveness of a printed self-help manual for AjD symptoms among burglary victims. The authors argued that AjD is due to its high prevalence, its nature as mild disorder, and its high rates of spontaneous remission perfectly suited for low threshold interventions such as unguided bibliotherapy. The intervention targeted the core symptoms of AjD for ICD-11 among burglary victims. The first two sections of the printed manual contain psychoeducation about stressful life events and adjustment problems, and they contain a screening questionnaire to assess whether face-to-face therapy is indicated. The third part comprises the main body of the manual and contains CBT-based exercises from treatment of posttraumatic stress disorder, anxiety disorders, and depression. The exercises are structured in a modular way over the four pillars sense of self, coping, activation, and relaxation (Bachem & Maercker, 2016b). In a randomized controlled trial, burglary victims with clinical and subclinical presentations of AjD symptoms who received the intervention were compared to a wait-list control group. Symptoms were assessed before randomization, after four weeks of intervention, and after a four weeks follow-up period (intervention group only). The authors reported a larger reduction of preoccupation in the intervention group compared to the control group after the intervention period. There was no significant group x time interaction for failure to adapt symptoms or the ADNM-20 sum score; however, on a descriptive level the within-group pre-post comparison revealed a greater reduction of symptoms in the intervention group compared to the control group. The reliable change was larger in the intervention group than the control group for the ADNM-20 sum score, preoccupation, and failure to adapt. The rate for tentative diagnosis of AjD according to a diagnostic algorithm (Glaesmer et al., 2015) post-intervention was lower in the intervention group than the control group. The reported symptom reductions persisted over the one-month follow-up period of the intervention group. Overall,

84.6% of the participants indicated that they were satisfied with the self-help manual (Bachem & Maercker, 2016b).

The finding on differential treatment effects for preoccupation with the stressor and failure to adapt symptoms is particularly interesting in light of the findings from Paper 1 of the present thesis. Among other studies (cf. Chapter 7.1.), we found evidence that AjD is a unidimensional construct and that the symptoms could be explained by a single underlying dimension. However, preoccupation and failure to adapt behaved differently with outside variables, which might reflect some uniqueness to these factors (Paper 1). This distinctiveness of the factors is supported by the result that treatment effects were different for preoccupation with the stressor from failure to adapt. The authors hypothesise that failure to adapt might be more difficult to target because it is a more heterogeneous symptom category (Bachem & Maercker, 2016b). Thus, future research regarding the structure of AjD should further investigate the distinction between the currently defined core symptoms for ICD-11 and different target-specific interventions.

Bachem and Maercker (2016b) conclude that unguided self-help for AjD bears a great potential for early intervention, may accelerate the recovery from stressful life events, and may reduce the need for face-to-face therapy. A further implementation strategy of (unguided) self-help are electronic mental health (e-health) interventions. A large amount of e-health interventions has been proven effective for common mental disorders, such as depression or anxiety disorders (cf. Titov et al., 2013). E-health interventions are advantageous because they are widely accessible, independent of place and time, and of low-cost for care providers and patients (Cuijpers & van Andersen, 2008). The nature of AjD as transient disorder seem to make it a prime candidate for low-threshold, widely accessible e-health interventions (Maercker, Bachem, Lorenz, Moser, & Berger, 2015). The feasibility and usability of a first online version of the self-help manual (Bachem & Maercker, 2016b) was supported in a pilot study (Moser,

2015). Currently, an updated version of the manual that is supposed to be applicable to all index events is under evaluation (Moser, Bachem, Berger, & Maercker, 2017).

A further e-health intervention for AjD has been developed in Lithuania. The *Brief Adjustment Disorder Intervention (BADI)* is a modular internet-based intervention that targets individuals with AjD or individuals who experienced a critical life event (Skruibis et al., 2016). The intervention is based on cognitive-behavioural therapy approaches, mindfulness practices, and social support interventions. It consists of the four modules relaxation, time management, mindfulness, and strengthening relationships each comprising of three exercises (Skruibis et al., 2016). The intervention was tested in a randomized controlled trial comparing BADI as a stand-alone intervention to a wait-list control group (Eimontas, Rimsaite, Gegieckaite, Zelviene, & Kazlauskas, 2017). Both groups showed a significant decline in AjD symptoms over the course of 30 days, however the decline in the intervention group was significantly larger than the decline in the control group. The dropout rates in both groups were extremely high (Eimontas, Rimsaite et al., 2017). In another comparison, the stand-alone intervention was compared to BADI including therapist support (Eimontas, Gegieckaite et al., 2017). In the intervention group including therapist support, participants had the opportunity to contact a psychotherapist after each exercise to comment on or ask questions about the usage of BADI. The authors found no differences between the stand-alone and the therapist support condition for the decline in AjD core symptoms. In the intervention group with therapist contact, 91% of the individuals requested support. There were no significant differences between intervention groups in the amount of exercises carried out, however there was a significantly higher dropout-rate in the standalone group compared to the therapist supported group (Eimontas, Gegieckaite et al., 2017). In general, both studies support the effectiveness of the BADI intervention for the reduction of AjD symptoms. However, in all comparisons, the dropout rates were extremely high and methods for enhancing patient adherence should be developed (Eimontas, Rimsaite et

al., 2017). Therapist support might not be a necessary requirement for positive outcome of the intervention; however, a direct contact with a therapist might decrease the attrition rate. For further considerations of cost-effectiveness, this might imply that policy makers should evaluate the balance between adherence rates with support and the costs for the support (Eimontas, Gegieckaite et al., 2017).

Both recently developed treatments of AjD symptoms support the applicability of low threshold interventions for AjD. Both combine multiple techniques from different psychotherapeutic approaches and were proven effective in randomized controlled trials. Besides the advantages of being cost-effective and widely accessible, low threshold interventions bear the potential to counteract some of the obstacles for treatment seeking, such as fear of stigma by the individual, busyness by the provider, or limited availability in the system (Collins, Westra, Dozois, & Burns, 2004). As mentioned before, AjD is a frequently used diagnosis in primary care (Fernandez et al., 2012), among psychiatrists (Reed et al., 2011), and among clinical psychologists (Evans et al., 2013). However, it is at the same time among the most problematic diagnosis (Reed et al., 2011) and accurate detection of cases is made difficult due to the formerly fuzzy diagnostic criteria and the lack of standardized assessment instruments (Casey & Doherty, 2012). One study showed that only two out of 110 cases of AjD were detected by the general practitioner and in 72 of the cases the general practitioner only noted a physical problem on the chart (Fernandez et al., 2012). In fact, a significant number of patients with AjD report psychosomatic symptoms, such as demoralization, health anxiety, alexithymia or irritable mood (Grassi et al., 2007). AjD affected individuals reported higher quality of life than patients with major depression or anxiety disorders but lower quality of life than primary care patients with no mental health impairments (Fernandez et al., 2012), which makes the distinction between disorder and non-disorder harder as there are gradual differences instead of qualitative ones (Bachem & Casey, 2017). They furthermore reported more self-

perceived stress than primary care patients with no mental health diagnosis or anxiety disorders (Fernandez et al., 2012). It can be expected that a significant number of individuals affected by AjD will still enter the health care system through primary care settings, which makes an improvement of detection of cases a prerequisite for the adequate care of AjD patients. Besides a training of primary care practitioners, standardized instruments could improve recognition of cases. However, they need to be accurate, short, and easily applicable in day-to-day practice. The improvement of recognition of AjD in primary care settings is clearly a direction that future research should focus on.

Another focus for future developments in AjD is the implementation of effective treatment of patients. To date, official guidelines on the treatment of AjD are almost non-existant. The Netherlands are one of the rare exceptions who released two guidelines for managing AjD in occupational and primary health care (van der Klink & van Dijk, 2003). AjD, understood as an umbrella term for stress, neurasthenia, adjustment disorder diagnosis, nervous breakdown, and burnout, causes half of the work disability in the Netherlands (van der Klink & van Dijk, 2003). The guidelines for occupational and primary health care promote an intervention strategy that aims at regaining control and resuming earlier activities. The three phases of treatment are based on stress inoculation training. In the first phase, the individual learns to understand what happened and how to cope emotionally with stress. The second phase helps individuals to gain insight into the stressors and into possible solutions. These solutions and skills should the put into practice in the third phase of treatment. In all three phases, there are interventions that help to complete the three recovery phases and to actively monitor the progress. The same scheme can be applied to the work situation, in which the management and the direct supervisors play an important role for recovery. The treatment is completed by a specific relapse prevention (van der Klink & van Dijk, 2003). The effectiveness of this treatment compared to care as usual was evaluated in a cluster randomized controlled trial (van der Klink, Blonk, Schene, & van Dijk,

2002). In the intervention group, the rate of individuals partially returned to work after three months was higher, and time to return to work and duration of sick leave were shorter compared to care as usual. However, they found no differences between groups on other health outcomes, such as psychopathology, after the intervention period (van der Klink et al., 2002). In a retrospective cohort study, 84% of individuals had partially returned to work and 73% had completely recovered from AjD after a period of one year. Lower quality of implementation was primarily caused by an incomplete assessment and long time periods between consultation. Interventions that aimed at the organization and continuity of care were factors associated to a shorter duration of sickness absence (Nieuwenhuijsen, Verbeek, Siemerink, & Tummer-Nijsen, 2003).

This is the only scientifically evaluated guideline for AjD patients so far, which makes a comparison to other models of care impossible. However, this guideline rather describes a specific intervention strategy than general guidelines for the care of individuals affected by AjD. Instead of only recommending specific interventions, a stepped care approach could be useful in the context of AjD. Stepped care models are thought to provide the least intensive and the least expensive treatment option for patients affected by a given disorder. If a low intensity treatment fails to be effective, a higher intensity treatment that is defined as the next step by the model will be entered (Bower & Gilbody, 2005). In the case of AjD, the first step could be a self-guided intervention such as the bibliotherapy or the internet-based intervention introduced before. If the mental health of the patient is not improved after the intervention, the next step could incorporate a treatment that is guided or includes face-to-face contact. Stepped care models were successfully implemented and evaluated in the context of depression and anxiety disorders (e.g. Gidding, Spigt, & Dinant, 2014; Goorden et al., 2014; Muntingh et al., 2013). The development of stepped care models are based on effectiveness, efficacy, and cost-effectiveness trials for different treatment approaches for a given disorder, and clinical and

economic evaluations of the stepped care model as a whole. The sparse empirical literature on AjD and its treatment complicate the development of stepped care models. However, the nature of AjD being a sub-threshold disorder that is at the crossover between healthy adjustment and severe psychopathology make it a prime candidate for stepped care approaches in order to reduce the individual's and society's burden of disease (e.g. Bachem & Casey, 2017).

7.5. General Conclusion

The present thesis was among the first pieces that systematically investigated the ICD-11 definition for adjustment disorder. The first paper can contribute to our understanding of adjustment disorder symptoms and provides insight into the measurement of this disorder. Symptoms of an adjustment disorder seem to be a blur of different emotional and behavioural exaggerated stress-responses (i.e. failure to adapt symptoms) and have distinct cognitive characteristics of preoccupation with the stressor. The second paper proposed a socio-interpersonal understanding of adjustment disorder and identified characteristics that seem to be relevant for symptom development. Acknowledging the social environment, such as social support or social exchanges about the experience, might help to understand and ultimately treat reactions of maladjustment. The third paper expanded this work and investigated trajectories of symptomatology. There seems to be a specific subset of individuals that experience particular difficulties in the aftermath of life events, who could be a target population for specific selective prevention strategies. The specific focus on individuals affected by job loss allowed insights into the close connection between work activities and mental health in Switzerland. Overall, the present thesis can advance our understanding of maladjustment to acute or chronic psychosocial stressors in the new ICD-11 framework of disorder specifically associated with stress and support the re-definition of adjustment disorder.

I hope that this dissertation stimulates fruitful discussions and empirical investigations of adjustment disorder. Every individual around the world may experience adjustment problems at one point in their lives as almost all of us are affected by unpredictable obstacles during our life course. It should therefore be in everybody's interest to better understand pathological reactions to life stress in order to provide optimal care for individuals struggling with a changed reality.

8. Publications

8.1. Is Adjustment Disorder Unidimensional or Multidimensional? Implications for ICD-11

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Abstract

Objectives: In preparation for ICD-11, the adjustment disorder (AjD) diagnosis has undergone considerable revisions; however, the latent structure of AjD remains uncertain. It is unclear whether AjD is best represented as a unidimensional or multidimensional construct. The present study performed a comprehensive assessment of the latent structure of AjD symptomatology, and assessed its concurrent and discriminant validity.

Methods: Individuals who experienced involuntary job loss (N=333) completed a self-report measure of AjD symptoms. Seven alternative models of AjD were tested using confirmatory factor analysis (CFA). General psychological distress, impairment in social functioning, occupational self-efficacy, and sense of coherence were used as criterion variables for construct validity.

Results: In the CFA, a bifactor solution with one dominant general AjD factor and five correlated group factors (preoccupation, failure-to-adapt, avoidance, affective reaction, and impulsivity) provided optimal fit. As expected, the AjD factor showed strong positive associations with general psychological distress and impairments in social functioning, and moderately negative associations with occupational self-efficacy, and sense of coherence.

Conclusions: With regard to uni- or multi-dimensionality of AjD symptoms, the current results indicate the plausibility of a unidimensional conceptualisation. Future research should focus on essential key characteristics and a reduction of symptoms for the AjD definition.

Is Adjustment Disorder Unidimensional or Multidimensional? – Implications for ICD-11

The World Health Organization's (WHO) International Classification of Diseases, version 11 (ICD-11) will contain a revised definition of adjustment disorder (AjD; Maercker et al., 2013). AjD is defined as the development of emotional and behavioural symptoms in response to a non-traumatic external life stressor, and will therefore be grouped within the disorders specifically associated with stress category (Maercker et al., 2013). The current proposal characterizes preoccupation with the stressor (PRE) and failure to adapt (FTA) symptoms as essential features of AjD (Keeley et al., 2016; Maercker et al., 2013). In addition to these core symptoms, the description of AjD also includes associated symptoms of avoidance, depression, anxiety, and impulsivity (Maercker et al., 2013).

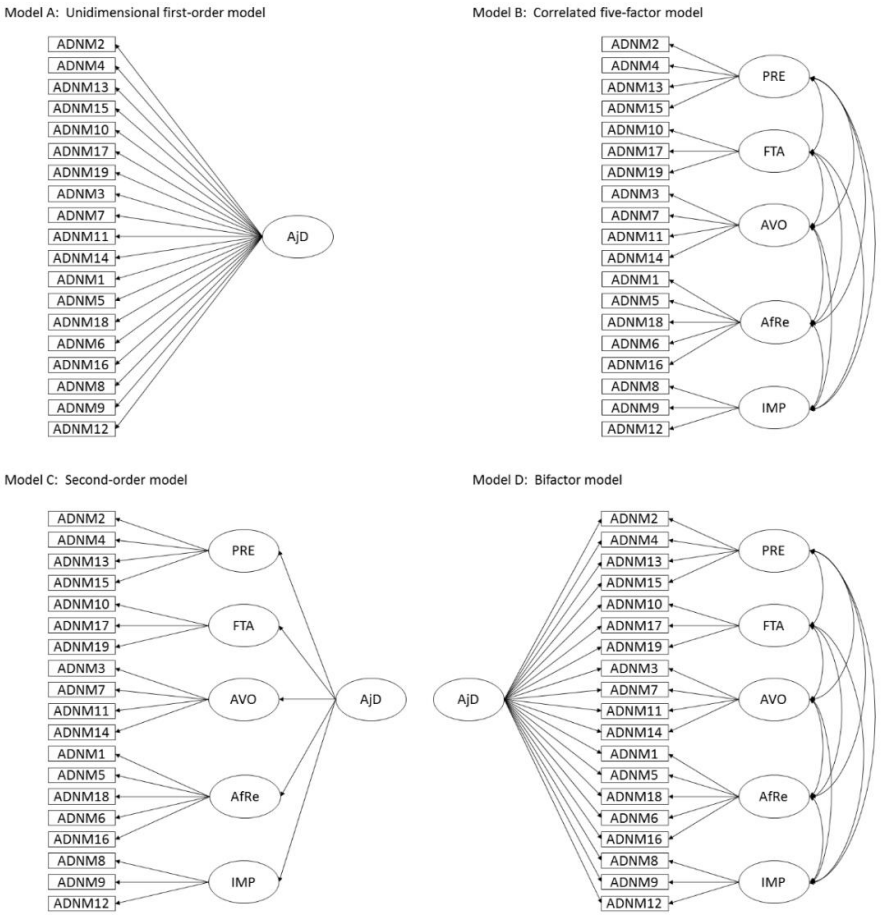
During the revision process for ICD-11, a preliminary self-report questionnaire of AjD symptoms was developed: *The Adjustment Disorder – New Module* (ADNM; Einsle, Köllner, Dannemann, & Maercker, 2010). An exploratory factor analysis (EFA) was initially performed on a pool of 29 items and a six factor solution emerged (PRE, FTA, avoidance, depression, anxiety, impulsivity; Einsle et al., 2010). Based on these EFA results, the scale was shortened to include 19 symptom indicators plus an additional item that screens for functional impairment. Glaesmer and colleagues (2015) tested the factorial validity of the revised ADNM-20 among a representative sample of the German population. Using confirmatory factor analysis (CFA), three alternative models of the latent structure of the AjD symptoms were compared: (1) a unidimensional model, (2) a correlated six-factor model, and (3) a second-order model in which the correlations between the first-order factors are explained by a single AjD factor. All models exhibited acceptable fit results, and the authors favoured the six-factor solution. The correlations between the six factors ranged from .75 to .96 suggesting a high degree of similarity across these factors (Glaesmer et al., 2015). The latent structure of the ADNM-20 was also

investigated within a representative sample of the Lithuanian population (Zelviene, Kazlauskas, Eimontas, & Maercker, 2017), however support for the six-factor model was limited. While model fit results suggested that this solution provided a reasonable approximation of the data, the factor correlations were extremely high, with a number of factor correlations exceeding a value of 1. The very high level of association observed between the factors points towards the plausibility of a unidimensional structure (at either a first, or a second-order level), however no such models were evaluated in this study.

The existing data provides evidence of multidimensionality and unidimensionality, thus further research is required to determine the exact nature of the latent structure of AjD symptoms. One solution to this problem may lie in the application of confirmatory bifactor modelling (CBM; Reise, 2012). CBM is a statistical process that allows researchers to model unidimensionality and multidimensionality simultaneously, and at the same conceptual level. CBM has many similarities to traditional second-order factorial models but is distinctive, and advantageous in two ways. First, within a second-order factorial model the relationship between the unidimensional factor (e.g., AjD) and the observable indicators (e.g., AjD symptoms) is indirect via the first-order factors (e.g., PRE), whereas, within a bifactor model this relationship is direct (see Figure 4). Secondly, unlike a second-order model, CBM affords researchers the opportunity to determine whether the observed covariation between symptom indicators is due primarily to a single 'general factor' (e.g., AjD), or due to multiple 'group factors' (e.g., PRE, FTA etc.) via inspection of the respective factor loadings. This process can therefore reveal whether a given construct is primarily uni- or multi-dimensional.

The uncertainty regarding the latent structure of AjD is problematic given the impending publication of ICD-11. There is a need to address the question of whether AjD should be viewed as a multidimensional or unidimensional construct given that knowledge on dimensionality has important implications regarding diagnosis. For example, it is of importance to know whether

a cut-off score related to the number of symptoms has to be used, whether different symptom criteria for diagnosis are necessary, or whether certain symptoms need to be present within respective clusters. The current study is therefore performed with two aims in mind: (1) to determine the factorial validity of AjD through a comprehensive assessment of a range of alternative (uni- and multi-dimensional) factorial solutions; and (2) to determine the concurrent and discriminant validity of AjD through assessments of associations with a range of criterion variables. We expected AjD to show positive associations with general psychological distress and impairment in social functioning, and to be negatively associated with the stress-coping resources of specific self-efficacy and sense of coherence.



Notes: AjD = Adjustment disorder; PRE = Preoccupation; FTA = Failure to Adapt; AVO = Avoidance; AfRe = Affective Reaction; IMP = Impulsivity; ADNM1-19 = measured variables. All models including error variances.

Figure 4: *Alternative Model Structures of Adjustment Disorder Symptoms*

Method

Participants & Procedure

The data used for the present analyses derived from the first wave of the Zurich Adjustment Disorder Project. The sample comprised of N = 333 participants who involuntarily lost their jobs within 9 months prior to participation. Participants were recruited in the greater Zurich area via local job agencies. The study was approved by the Ethics committee of the University of Zurich in June 2015 and all participants gave written informed consent before the assessment. Participants were excluded if they did not speak German fluently, were aged under 18 years, were unable to give written informed consent, or suffered from a severe mental illness. Gender was equally distributed across the sample (male: n = 170, 51.1%; female: n = 163, 48.9%). The mean age was 43.8 years (*SD* = 10.7) with the male subsample being slightly older (*M* = 45.0, *SD* = 10.5) than the female subsample (*M* = 42.5, *SD* = 10.8; $t(331) = 2.16$, $p = .032$, $d = .24$).

Measures

The *Adjustment Disorder – New Module 20* (ADNM-20; Einsle et al., 2010) was used to assess AjD symptom severity. It is a self-report questionnaire comprised of a stressor list (19 stressful life events) and a symptom list (19 items, plus 1 item that reflects functional impairment). We only used a contextualized version of the 19-item symptom list to measure all AjD symptoms with regard to the job loss. All items are answered on a 4-point Likert scale ranging from 1 (‘*never’*) to 4 (‘*often’)*. The ADNM-20 has been validated in several studies regarding internal consistency, retest-reliability, and discriminant and concurrent validity (Bley, Einsle, Maercker, Weidner, & Joraschky, 2008; Einsle et al., 2010). The internal reliability of the ADMN-20 among the current sample was satisfactory ($\alpha = .93$).

We used the *Brief Symptom Inventory, Short Form* (BSI-18; Spitzer et al., 2011) to measure general psychological distress. Eighteen items measure the syndromes *somatization*, *depression*, and *anxiety* on a 5-point Likert scale, ranging from 0 (‘*not at all’*) to 4 (*‘very strong’*). A higher sum score of all 18 items (General Severity Index, GSI) indicates higher psychological distress. The German short version showed satisfying psychometric properties with regard to factorial validity, internal consistency, retest-reliability, and discriminant and concurrent validity (Franke et al., 2011; Spitzer et al., 2011). The internal consistency in the present study was $\alpha = .88$.

The *Social Functioning Questionnaire* (SFQ; Tyrer et al., 2005) was used to assess perceived social function. As we were not aware of an existing German version, we translated the English version in a translation - back translation process. It consists of eight items covering work and home tasks, financial concerns, relationships with family, sexual activities, social contacts, and spare time activities as domains of functioning. The item format is a 4-point Likert scale with different labels for each question. A higher score indicates higher impairment in social functioning. The SFQ showed satisfying results with regard to retest reliability and concurrent validity (Seivewright, Tyrer, & Johnson, 2004; Tyrer et al., 2005). The internal consistency in this study was $\alpha = .76$.

The *Occupational Self-Efficacy Scale* (OcSe; Schyns & Collani, 2002) measured self-efficacy with regard to challenges in the work context. The 8 items are answered on a 6-point Likert scale ranging from 1 (‘*not at all true’*) to 6 (‘*completely true’*) and the total score is obtained by summing up all items. The factorial validity, internal consistency, and concurrent and discriminant validity have been supported in previous studies (Rigotti, Schyns, & Mohr, 2008; Schyns & Collani, 2002). The internal consistency in this study was $\alpha = .88$.

We used the *Sense of Coherence Scale – Revised* (SOC-R; Bachem & Maercker, 2016) to measure sense of coherence. Thirteen items measure on a 5-point Likert scale, ranging from

1 (‘*not at all’*) to 5 (‘*completely’*), the three facets of *manageability*, *reflection*, and *balance*. The total score is obtained by summing up all variables. Two validation studies showed factorial validity, satisfying internal consistency, and concurrent and discriminant validity (Bachem & Maercker, 2016; Mc Gee, Hoeltge, Maercker, & Thoma, 2017). The internal consistency in the present study was $\alpha = .68$.

Statistical Analysis

In total, seven alternative models of the ADNM-20 were evaluated. As a first step, we established the optimal factorial solution on a first-order level by comparing four first-order (correlated) factor models. Based on these results, we estimated a second-order model to explain the covariations at the first-order level. Furthermore, two bifactor models were tested in order recognise the distinction between a fully-restricted, and unrestricted bifactor conceptualisation (Hyland, 2015). In an unrestricted bifactor model the group factors are free to correlate with each other, while in the fully restricted bifactor model, the correlations between the group factors are constrained to zero. Importantly, in both the restricted and unrestricted bifactor models the group factors are uncorrelated with the general factor.

First-order factor models: Model 1 is a single factor solution in which all 19 items load on an *adjustment disorder* factor (see Figure 4, Model A). *Model 2* distinguished between a *core symptom* factor (7 items: PRE and FTA) and an *accessory symptom* factor (12 items: avoidance, depression, anxiety, and impulsivity). *Model 3* represented the basic six-factor model with each symptom group as a separate factor (PRE, FTA, avoidance, depression, anxiety, and impulsivity). In *Model 4*, the depression and anxiety factors were combined into a single factor (*affective reaction*) while the structure of Model 3 was maintained (see Figure 4, Model B).

Second-order factor model: Model 5 included one second-order factor (AjD) to explain the factor correlations between the best-fitting first-order model (see Figure 4, Model C).

Bifactor models: Model 6 was an unrestricted (correlated general factors) bifactor model that included one general factor (AjD) in addition to the factors identified by the best fitting first-order model (see Figure 4, Model D). *Model 7* was a restricted variation of Model 6, in which the group factors were uncorrelated.

All models were tested using Mplus, Version 7.4 (L. K. Muthén & Muthén, 2007) using the robust weighted least squares, mean- and variance-adjusted (WLSMV) estimator (Joreskog, 1994; B. Muthén, du Toit, & Spisic, 1997). The WLSMV has been demonstrated to produce accurate parameter estimates, standard errors, and test-statistics when ordinal indicators are used (Flora & Curran, 2004). Standard recommendations for assessing model fit were followed (Hu & Bentler, 1999), whereby acceptable model fit is indicated by a chi-square to degree of freedom ratio (χ^2:df) of less than 3:1 (Kline, 2005); Comparative Fit Index (CFI; Bentler, 1990) and Tucker-Lewis Index (TLI; Tucker & Lewis, 1973) values greater than .90; Root-Mean Square Error of Approximation with 90% confidence intervals (RMSEA 90% CI) value less than .08 (Steiger, 1990); and a Weighted Root Mean Square Residual (WRMR) values less than 1 (Yu, 2002). Importantly, the CFI, and the RMSEA include penalties for model complexity.

In order to assess concurrent and discriminant validity of the resulting model, we computed the unique partial correlations between each latent variable and the four manifest criterion variables.

Table 1

Item Category Frequencies for the ADNM-20

Item Content	Scale Value (%)				
	1 never	2 rarely	3 sometimes	4 often	% missing
Preoccupation					
ADNM2. I have to think about the job loss repeatedly.	12.3	22.8	36.0	28.2	0.6
ADNM4. I have to think about the job loss a lot and this is a great burden to me.	21.9	29.7	32.7	15.0	0.6
ADNM13. I constantly get memories of the job loss and cannot do anything to stop them.	30.3	32.4	27.3	9.6	0.3
ADNM15. My thoughts often revolve around anything related to the job loss.	32.4	42.3	20.1	4.2	0.9
Failure to Adapt					
ADNM10. Since the job loss, I find it difficult to concentrate on certain things.	37.5	33.3	23.1	6.0	0
ADNM17. Since the job loss, I do not like going to work or carrying out the necessary tasks in everyday life.	41.7	31.2	19.5	7.2	0.3
ADNM19. Since the job loss, I can no longer sleep properly.	42.0	26.4	19.8	11.1	0.6

Table 1 *(continued)*

Item Content	Scale Value (%)				
	1 never	2 rarely	3 sometimes	4 often	% missing
Avoidance					
ADNM3. I try to avoid talking about the job loss whenever possible.	27.6	35.4	23.4	13.2	0.3
ADNM7. I avoid certain things that might remind me of the job loss.	47.1	27.3	16.5	8.7	0.3
ADNM11. I try to dismiss the job loss from my memory.	38.1	25.5	18.9	17.1	0.3
ADNM14. I try to suppress my feelings because they are a burden to me.	35.4	31.8	23.7	8.7	0.3
Affective Reaction					
ADNM1. Since the job loss, I feel low and sad.	11.4	29.4	47.1	12.0	0
ADNM5. I rarely do those activities, which I used to enjoy anymore.	45.6	23.7	18.3	11.4	0.9
ADNM18. I have been feeling dispirited since the job loss and have little hope for the future.	34.8	31.5	24.6	8.7	0.9
ADNM6. If I think about the job loss, I find myself in a real state of anxiety.	52.9	25.8	16.5	4.5	0.3
ADNM16. Since the job loss, I am scared of doing certain things or of getting into certain situations.	50.5	24.9	18.6	5.7	0.3

Table 1 *(continued)*

Item Content	Scale Value (%)				
	1 never	2 rarely	3 sometimes	4 often	% missing
Impulsivity					
ADNM8. I am nervous and restless since the job loss.	23.4	37.8	28.2	10.2	0.3
ADNM9. Since the job loss, I lose my temper much quicker than I used to, even over small things.	38.7	32.1	21.0	7.8	0.3
ADNM12. I have noticed that I am becoming more irritable due to the job loss.	37.5	31.5	24.3	6.0	0.6
Functional Impairment					
ADNM20. Overall, the situation causes serious impairment in my social or occupational life, my leisure time, and other important areas of functioning.	24.6	40.5	23.1	11.4	0.3

Results

Descriptives

Participant scores on the ADNM-20 were *M* = 41.9 (*SD* = 12.8, Mdn = 41.0, range = 20-76), with women (*M* = 44.0, *SD* = 13.0) on average scoring higher than men (*M* = 39.9, *SD* = 12.2; $p < .01$, *d* = 0.33). According to a diagnostic algorithm (Glaesmer et al., 2015), 26.7 % (n = 89) of the sample met the criteria for a tentative diagnosis of AjD (women: 33.7 %; men: 20.0 %). Age was associated with higher symptomatology (r = .16, $p < .01$). Table 1 provides information on the frequencies for each item category of the ADNM-20. The means of the criterion variables were *M* = 7.2 (*SD* = 7.2, Mdn = 5.0, range = 0-43) for the general psychological distress, *M* = 6.2 (*SD* = 4.0, Mdn = 6.0, range = 0-19) for the impairment in social functioning, *M* = 27.6 (*SD* = 5.5, Mdn = 29.0, range = 6-36) for the occupational self-efficacy, and *M* = 50.0 (*SD* = 5.3, Mdn = 50.0, range = 27-65) for sense of coherence. Compared to men, women reported higher general psychological distress (women: *M* = 8.2, *SD* = 7.6; men: *M* = 5.9, *SD* = 6.6; $p < .01$, *d* = 0.32), higher impairment in social functioning (women: *M* = 6.7, *SD* = 4.1; men: *M* = 5.7, *SD* = 3.8; $p < .05$, *d* = 0.25), and lower occupational self-efficacy (women: *M* = 26.6, *SD* = 5.9; men: *M* = 28.6, *SD* = 5.0; $p < .01$, *d* = 0.37). There were no gender differences in sense of coherence (women: *M* = 50.0, *SD* = 5.3; men: *M* = 50.0, *SD* = 5.26).

CFA

The results of the CFA can be found in Table 2. Models 1-6 converged normally, while Model 7 included one negative residual variance on item ADNM11. Amongst the first-order factor models, Models 1 and 2 yielded unsatisfactory fit estimates, while Models 3 and 4 were found to provide a reasonable approximation of the data. Inspection of the factor correlations between the depression and anxiety factors in Model 3 revealed an extremely high level of association between these factors (r = .96). Model 4, which combined the depression and

anxiety factors into a single latent variable, was therefore preferred on the grounds of parsimony and interpretability.

The second-order model, Model 5, also yielded reasonable fit estimates, however these were slightly worse than Models 3 and 4. Model 6, the unrestricted bifactor solution that contains one general AjD factor, and five correlated group factors (PRE, FTA, avoidance, affective reaction, and impulsivity), exhibited excellent model fit across the majority of indices. This suggested that Model 6 provided the best fit of the data (see Figure 4, Model D)

Table 2

Fit Indices for Alternative Models of the Structure of Adjustment Disorder (n = 333)

Model	χ^2	df	CFI	TLI	RMSEA (95% CI)	WRMR
	First-order factor models					
1	817.672	152	.909	.898	.115 (.107 - .122)	1.713
2	788.718	151	.913	.902	.113 (.105 - .120)	1.679
3	407.621	137	.963	.954	.077 (.068 - .086)	1.079
4	421.028	142	.962	.954	.077 (.068 - .085)	1.111
	Second-order factor model					
5	499.171	147	.952	.944	.085 (.077 - .093)	1.263
	Unrestricted bifactor model					
6	**259.260**	**123**	**.981**	**.974**	**.058 (.048 - .067)**	**.774**
	Restricted bifactor model					
7^	363.616	133	.969	.960	.072 (.063 - .081)	1.030

Note. All χ^2 statistics were significant. CFI = Comparative Fit Index; TLI = Tucker-Lewis-Index; RMSEA = Root-Mean Square Error of Approximation; WRMR = Weighted Root Mean Square Residual. ^ Heywood Case.

Standardized factor loadings

Standardized factor loadings for the Model 6 are presented in Table 3. The pattern of factor loadings indicated the dominance of a general factor of AjD. All items loaded onto the general factor in a consistent manner; each item was positive, statistically significant ($p < .001$), and of a robust magnitude. Furthermore, 16 of the 19 items possessed stronger factor loadings on the general factor than on the respective group factors; one item exhibited a marginally stronger loading on its group factor compared to the general factor; and two items possessed factor loadings of equal magnitude on the general and group factors. Overall, the results of Model 6 strongly favoured the interpretation of a unidimensional, rather than multidimensional, latent structure of the ADNM-20.

Table 3

Standardized Factor Loadings (Standard Error) for the Unrestricted Bifactor Model (Model 6)

Item	AjD	PRE	FTA	AVO	AfRe	IMP
ADNM2	0.620 (.046)	0.497 (.056)				
ADNM4	0.815 (.029)	0.365 (.054)				
ADNM13	0.769 (.034)	0.427 (.061)				
ADNM15	0.774 (.030)	0.243 (.057)				
ADNM10	0.770 (.034)		0.344 (.067)			
ADNM17	0.645 (.041)		0.349 (.070)			
ADNM19	0.750 (.029)		0.103(.070)$^{+}$			
ADNM3	0.326 (.054)			0.357 (.070)		
ADNM7	0.730 (.033)			0.359 (.059)		
ADNM11	0.509 (.053)			0.680 (.078)		
ADNM14	0.696 (.035)			0.307 (.058)		
ADNM1	0.728 (.033)				0.039 (.060)$^{+}$	
ADNM5	0.661 (.038)				0.158 (.077)*	

Table 3 *(continued)*

Item	AjD	PRE	FTA	AVO	AfRe	IMP
ADNM18	0.758 (.033)				0.430 (.096)	
ADNM6	0.807 (.029)				-0.098 (.071)$^{+}$	
ADNM16	0.726 (.033)				0.220 (.079)**	
ADNM8	0.790 (.027)					0.269 (.055)
ADNM9	0.654 (.041)					0.650 (.068)
ADNM12	0.666 (.040)					0.545 (.059)

Note. All $p < .001$, unless indicated. ADNM = Adjustment Disorder – New Module; PRE = Preoccupation; FTA = Failure to Adapt; AVO = Avoidance; AfRe = Affective Reaction; IMP = Impulsivity.
$^{+}$ n.s.; * $p < .05$; ** $p < .01$

Factor Correlations

Table 4 displays the factor correlations for Model 6. PRE correlated strongly with FTA and affective reaction; FTA correlated moderately with avoidance and affective reaction; and all other correlations were weak. Most notably, after controlling for the general AjD factor, the relationship between the core symptom clusters of PRE and FTA was negative (r = -.70).

Table 4

Factor Correlations in the Unrestricted Bifactor Model (Model 6)

	1. PRE	2. FTA	3. AVO	4. AfRe
1. PRE	1			
2. FTA	-.702**	1		
3. AVO	.192	-.534**	1	
4. AfRe	-.703***	.642***	-.121	1
5. IMP	-.223	.305*	-.185	-.213

Note. PRE = Preoccupation; FTA = Failure to Adapt; AVO = Avoidance; AfRe = Affective Reaction; IMP = Impulsivity.
* p < .05; ** p < .01; *** p < .001

Concurrent and discriminant validity

The concurrent and discriminant validity results can be found in Table 5. The general factor of AjD correlated significantly, strongly, and positively with psychological distress and impaired social functioning. Additionally, AjD correlated significantly, negatively, and moderately with occupational self-efficacy, and sense of coherence. The five group factors exhibited relatively weak correlations with each of the criterion variables, and many of these effects were non-significant.

Table 5

Partial Correlations between the Latent Factors in the Unrestricted Bifactor Model (Model 6) with External Criterion Variables: Concurrent and Discriminant Validity

	AjD	PRE	FTA	AVO	AfRE	IMP
General psychological distress	.647***	-.220***	-.009	-.106	.169*	-.129*
Impairment in social functioning	.635***	-.311***	.330***	-.068	.387***	.013
Occupational self-efficacy	-.391***	.129	-.266**	.066	-.435***	.075
Sense of coherence - revised	-.204***	.206**	-.016	.111	-.116	.182**

Note. AjD = Adjustment disorder; PRE = Preoccupation; FTA = Failure to Adapt; AVO = Avoidance; AfRe = Affective Reaction; IMP = Impulsivity.
* $p < .05$; ** $p < .01$; *** $p < .001$

Discussion

Given the impending publication of ICD-11, the present study aimed to explore the latent structure of adjustment disorder comprehensively and to elaborate further on the question whether this construct is best conceived as unidimensional or multidimensional. The results of the CFA indicate that a bifactorial structure of AjD symptoms fit the data best. It included the two core symptom groups of PRE and FTA, in addition to the three accessory symptoms groups reflecting avoidance, affective reaction, and impulsivity, plus one general factor that explained covariation across all 19 AjD symptoms. The factor loadings pointed towards the dominance of the general factor and thus towards a rather unidimensional conceptualisation of the construct.

An important finding from the current analyses was that the first-order model performed equally well when the anxiety and depression factors were combined into a single 'affective reaction' factor. Inclusion of a single affective reaction factor not only leads to a more parsimonious account of the latent structure of AjD symptoms, but is consistent with previous findings (Einsle et al., 2010; Glaesmer et al., 2015; Zelviene et al., 2017).

A number of interesting findings emerged from the bifactor model results post controlling for the AjD factor: (1) a significant *negative* association between PRE and FTA, and between PRE and affective reaction; (2) a *negative* correlation between PRE and psychological distress, and between PRE and impairment in social functioning; and (3) a *positive* correlation between PRE and sense of coherence. This may suggest that what is left behind in PRE, after the shared AjD variance is accounted for, might reflect an adaptive psychological response to stress. This emphasises the need to focus on functional impairment associated with, in particular, the PRE symptoms. Only in situations when PRE is associated with clear functional impairment should these experiences be interpreted as maladaptive. The difficulty of identifying functional impairment in AjD has already been discussed within a case vignette study in preparation for ICD-11 (Keeley et al., 2016). In a future revision of the scale, it might be beneficial to expand the measurement of functional impairment in order to make better assumptions about diagnostic status.

The analysis with regard to concurrent and discriminant validity of AjD demonstrated that the general AjD factor was strongly correlated with psychological distress and social functioning, and moderately associated with occupational self-efficacy and sense of coherence. Some earlier research on the construct validity of the new AjD definition has shown moderate associations with anxiety and depression (Einsle et al., 2010), and weak associations with coping behavior (Bley et al., 2008; Einsle et al., 2010), as well as differences in general self-efficacy between patients with and without a tentative diagnosis of AjD (Bley et al., 2008). The

current associations with the criterion variables are in the expected directions and support the construct validity of AjD.

There are some limitations with the present study. First, the data derived from a very specific, and homogenous sample, which limits the generalizability of the results. This sample allowed us to investigate the latent structure of AjD in a sample in which we expected higher occurrence of AjD symptoms and that experienced a prototypical precipitating life event. However, there is a need for further investigation in other populations and representative samples. Second, this study was based on a cross-sectional assessment. The stability over time of the latent structure and the predictive validity of AjD need to be investigated in future studies. Third, it will be important for future work to attempt to replicate the current study using clinician-administered diagnostic tools as the method of assessment may impact upon the reporting of symptoms, and thus may influence which factorial model best fits the data.

Several findings of the present study pointed in the direction of the unidimensionality of AjD. The ADNM-20 is a preliminary questionnaire for AjD symptoms offering the possibility to investigate a wide range of possible AjD symptoms but it is not exhaustive and it is not based on the definite, still outstanding diagnostic criteria of AjD for ICD-11. One of the guiding principles of the upcoming ICD-11 is to simplify diagnoses wherever possible by focusing on core symptoms to improve clinical utility (First, Reed, Hyman, & Saxena, 2015). In order to adhere with these standards, considerable revisions that would serve to simplify the definition of AjD would be beneficial. In light of the probable rejection of subtypes in ICD-11 (Maercker et al., 2013), a focus on essential key characteristics of AjD could improve the validity and utility of the diagnosis. The findings of the present analysis could indicate that there is a better fitting, more parsimonious solution based on a smaller amount of symptoms.

8.2. A Socio-Interpersonal Approach to Adjustment Disorder: The Example of Involuntary Job Loss

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Abstract

Background: Adjustment disorder (AjD) was redefined for ICD-11 with core symptoms of preoccupation with a stressor and failure to adapt. The socio-interpersonal framework model for stress-response syndromes suggests that interpersonal factors, besides intrapersonal processes, substantially contribute to the development of AjD.

Objective: The current study aimed to identify predictive factors in the development of AjD symptoms by the application of a framework model for stress-response syndromes.

Method: N=321 recently laid-off participants (47.7% female) were assessed with a newly developed standardized clinical diagnostic interview section on ICD-11 AjD. Self-report questionnaires measured AjD symptom severity, and interpersonal and intrapersonal predictors. Path analysis was used to model the associations between AjD symptom severity and the predictor variables. We conducted logistic regression to identify associated characteristics of diagnostic status.

Results: AjD symptoms were highly prevalent and 25.6% of participants met the diagnostic criteria. Higher loneliness, higher dysfunctional disclosure, and lower self-efficacy were associated with both higher symptom severity and higher likelihood of meeting the diagnostic criteria for AjD. Higher perceived social support was associated with higher likelihood for AjD diagnosis.

Conclusion: Research on risk factors for AjD is still sparse. This study provided empirical evidence on the role of interpersonal factors supporting the socio-interpersonal model for stress-response syndromes.

A Socio-Interpersonal Approach to Adjustment Disorder: The Example of Involuntary Job Loss

During the latest revision of the International Classification of Diseases (ICD) and the Diagnostic and Statistical Manual of Mental Disorders (DSM) the adjustment disorder (AjD) diagnosis has been re-conceptualized as a stress-response syndrome (Maercker et al., 2013; Strain & Friedmann, 2014). Stress-response syndromes are defined as an exaggeration of a stress response that can lead to mental illness (Horowitz, 1986). AjD describes the development of emotional or behavioral symptoms in response to a critical life event or external life stressor of minor intensity. It can occur after non-traumatic but serious acute or chronic life events such as an involuntary job loss (World Health Organization, 1992). The upcoming ICD-11 by the World Health Organization (WHO) proposes two core symptoms consisting of preoccupation and failure to adapt (Maercker et al., 2013). Preoccupation with the stressor is described as a state of recurring distressing thoughts about the event or its consequences, and of constant rumination. Failure to adapt symptoms subsume generalized stress-response symptoms, such as sleep disturbances or concentration problems (Maercker et al., 2013). Accessory symptoms, such as avoidance, anxiety, depressive symptoms, or impulsivity, can occur (Maercker et al., 2013).

Recent studies provided evidence for the proposed stress-response conceptualization for ICD-11 regarding its reliability and clinical utility (Bachem, Perkonigg, Stein, & Maercker, 2016; Glaesmer et al., 2015; Keeley et al., 2016; Zelviene, Kazlauskas, Eimontas, & Maercker, 2017). However, little is known about predictive factors or models for the development of this disorder. Studies found that female gender was a risk factor for adjustment problems in cancer patients (e.g., Hund et al., 2016). Further studies identified younger age, worse preceding mental health, higher alexithymia, neuroticism, psychoticism, harm avoidance, and lower self-transcendence as predictors of AjD in military recruits (Chen, Chen, Chen, & Lung, 2011;

Lung, Lee, & Shu, 2006; Na et al., 2012). Focusing on neurobiology, studies found decreased gray matter volume (Myung et al., 2016) and an increased sensitivity of the bimodal P300 amplitude (Kajosch et al., 2016) in patients diagnosed with AjD. Furthermore, various studies found interpersonal variables predicting AjD, e.g. lower cooperativeness (Chen et al., 2011), higher interpersonal distance, higher social diversion, and lower social support (Ponizovsky, Levov, Schultz, & Radomislensky, 2011). However, only few studies investigated psychological 'intrapersonal' factors, such as general self-efficacy (Fankhauser et al., 2010), self-esteem (Ponizovsky et al., 2011), and cognitive reappraisal (Hu et al., 2014) in the context of stress-response.

Socio-Interpersonal Model of Stress-Response Syndromes

Interpersonal relationships play an important role in regulating individual well-being (Antonucci, Ajrouch, & Birditt, 2014). They can differ in their closeness, quality, and structure, and may have different impacts on mental health (Antonucci et al., 2014), especially after stressful life events (Cohen & Wills, 1985). As indicated, initial empirical evidence exists that interpersonal factors are of particular importance for developing and maintaining AjD. The socio-interpersonal framework model by Maercker and Horn (2013) was developed for stress-response syndromes. It assumes that individuals are nested in different levels of social contexts that influence the recovery after extreme stress experiences. The first level includes social affective and related intrapersonal processes. Social affective reactions are affective states that refer to both self and others (e.g., Orth, Robins, & Soto, 2010), such as shame, anger, guilt, and loneliness (Hawkley & Cacioppo, 2010; Maercker & Horn, 2013). The second level of the socio-interpersonal framework model captures interaction processes in close relationships, such as social support, empathy and communication factors. Higher perceived social support was shown to be predictive of better mental health among crisis aid workers (Prati & Pietrantoni,

2010), and of less adjustment problems in cancer patients (Rizalar et al., 2014). Likewise, the quality of social support resources seems to influence the psychological adjustment outcome after stress exposure (Ajrouch, Abdulrahim, & Antonucci, 2013; Brewin, Andrews, & Valentine, 2000). Disclosure of stressful experiences has been shown to facilitate recovery from severe stress (Freedman, Gilad, Ankri, Rozier, & Shalev, 2015; Pennebaker, 1989; Pielmaier & Maercker, 2011). The third level includes societal and cultural factors. Mueller, Forstmeier, Wagner, and Maercker (2011) found that societal value orientations were directly and indirectly predictive of grief reactions and adjustment disorder symptoms.

There is some evidence for the validity of the socio-interpersonal framework model in different contexts of stress-response. Higher dysfunctional disclosure, lower social acknowledgement, and higher co-rumination, significantly predicted secondary PTSD symptoms in Belarusian rescue workers (Krutolewitsch, Horn, & Maercker, 2016). Maercker, Hilpert, and Burri (2016) found in former indentured child laborers that higher dysfunctional disclosure was associated with less life satisfaction, higher perceived social support was associated with less depressive symptoms, and higher social acknowledgement was associated with an increase in depressive symptoms over time. Furthermore, the risk of an AjD after a stressful life event for men was elevated when their female partner showed clinically significant symptoms of depression, and higher depressive symptoms in the female partner were associated with higher preoccupation in the male partner (Horn & Maercker, 2015). Fankhauser et al. (2010) found that motivation regulation and general self-efficacy mediated the negative relationship between social acknowledgement and AjD symptom severity, and that the reluctance to talk mediated the negative relationship between general self-efficacy and AjD symptom severity. These results support the view that contextual factors should be incorporated in research on stress-responses.

In the past, the AjD diagnosis had only been defined via the exclusion of other mental disorders, which resulted in too little research on the diagnostic features, its etiology, and treatment (e.g., Baumeister & Kufner, 2009). Since AjD has been re-conceptualised as a stress-response syndrome, the socio-interpersonal framework model should be applicable to this disorder. This creates the opportunity to investigate etiological factors in the development of the disorder based on theoretical assumptions. A prerequisite for a comprehensive analysis of interpersonal and intrapersonal predictors of AjD as proposed for ICD-11 would be a large enough sample with a homogeneous stressor event. Job loss is one of those critical life events that is frequent and can be regarded as example constellation for AjD. Research has shown its negative impact on physical health (Gallo et al., 2004), health behavior (Gallo, Bradley, Siegel, & Kasl, 2001), and mental health (Ziersch, Baum, Woodman, Newman, & Jolley, 2014), in particular the onset of depressive symptoms and anxiety reactions (Barbaglia, Have, Dorsselaer, Alonso, & de Graaf, 2014).

The current study intends to contribute empirical evidence for AjD as redefined for ICD-11. The first aim was to identify predictive factors for AjD symptom severity based on assumptions of the socio-interpersonal framework model and previous empirical evidence. It was expected that emotion regulation and self-efficacy as intrapersonal processes, and social support, loneliness and dysfunctional disclosure as interpersonal processes would be associated with AjD symptom severity. The second aim of the present study was to investigate the association of the same intra- and interpersonal characteristics with AjD diagnostic status.

Method

Participants and Procedure

The data for this analysis derived from the Zurich Adjustment Disorder Study, a longitudinal study cross validating the proposed AjD diagnosis for ICD-11 and DSM-5. The study was approved by the Ethics Committee of the University of Zurich in June 2015.

Table 6

Demographic Characteristics of Participants (N = 321)

	Full sample		Male		Female	
	M	*SD*	*M*	*SD*	*M*	*SD*
Age, years	43.70	10.64	44.88	10.44	42.42	10.76
Time since job loss, months	3.31	1.96	3.36	1.99	3.26	1.92
	Full sample		Male		Female	
	n	*%*	*n*	*%*	*n*	*%*
Job status						
Started a new job	26	7.8	10	6.0	15	9.8
Still unemployed	292	91.0	156	92.9	136	88.9
No information	4	1.2	2	1.2	2	1.3
AjD prevalence	81	25.6	35	21.1	46	30.7

Note. AjD Prevalence is based on n = 316 participants due to missing data.

Recruitment of participants took place from September 2015 to August 2016 in the greater Zurich area. Most of the participants were recruited via regional job centers. The personnel consultants handed out the study information or an advertising flyer to individuals eligible for participation. Interested individuals could then contact the study coordinator for further information and enrollment in the study. Other means of recruitment were three local

newspaper articles and a mailing list of the University of Zurich for people generally interested in study participation. All participants have been laid off within 9 months prior to participation. People were excluded from the study if they did not speak German fluently, were aged under 18 years, were unable to give written informed consent, or suffered from a severe mental illness. Interviews were conducted either at the University or at participants' home. After being informed about the aims and the procedure of the study, participants gave their written consent. A total of 463 people showed interest in study participation. Ninety-eight of them did not meet the inclusion criteria, 21 potential participants could not be reached again, and 10 people did not agree to participate for other reasons. This led to a total sample of 334 participants included in the study. The demographic characteristics of the sample can be found in Table 6. Gender was equally distributed across the sample (52.3% male; 47.7% female). The male sample was slightly older than the female sample ($t(319)= 2.08$, $p= .039$).

Measures

The *Diagnostic Status of AjD* was assessed by a modified version of the computer-assisted Munich Composite International Diagnostic Interview (M-CIDI: Wittchen & Pfister, 1997). The M-CIDI is a valid and reliable standardized clinical interview for the assessment of symptoms, syndromes, and diagnoses according to DSM-IV and ICD-10 (Wittchen, Lachner, Wunderlich, & Pfister, 1998; Wittchen & Pfister, 1997)**.** To determine the diagnostic status of AjD, a new AjD CIDI-module was designed (Perkonigg, Strehle, Lorenz, Beesdo-Baum, & Maercker, unpublished manuscript). In a first step, it assesses all events occurring within twelve months prior to the interview (including event characteristics). Next, the module asks for ICD-11 and DSM-5 symptoms occurring in response to the most severe event as indicated by the participant. In a third step, it assesses onset and recency of symptoms, and impairment due to the symptoms.

AjD Symptom Severity was assessed using the Adjustment Disorder - New Module 20 (ADNM-20: Einsle, Köllner, Dannemann, & Maercker, 2010). The ADNM-20 is a self-report questionnaire that evaluates previous life events and AjD symptoms in response to the most severe life event (Einsle et al., 2010). In the present study, we used a contextualized version of the ADNM-20 symptom list and all the items referred to the job loss. The response format is a 4-point Likert scale ranging from 1, *never* to 4, *often*. We used the eight items that measure preoccupation, failure to adapt, and functional impairment to build a total sum score (ADNM-8). The ADNM-20 showed satisfactory properties regarding factor structure, internal consistency, retest-reliability, and construct validity (Bley, Einsle, Maercker, Weidner, & Joraschky, 2008; Einsle et al., 2010; Glaesmer et al., 2015) in previous studies. The use of the ADNM-8 found initial support in two previous studies (Zelviene et al., 2017; Kazlauskas, Gegieckaite, Maercker, Eimontas, & Zelviene, 2017). The internal consistency in this study was $\alpha = .87$.

General Self-Efficacy was measured using the General Self-Efficacy Scale (GSE: Schwarzer & Jerusalem, 1999). It consists of 10 items that are answered on a 4-point Likert scale ranging from 1, *not correct* to 4, *absolutely correct*. The total score is calculated by using the sum of all variables. The GSE showed high internal consistencies of $\alpha = .75$-$.91$ and satisfactory discriminant and convergent validity (Hinz, Schumacher, Albani, Schmid, & Brähler, 2006; Schwarzer & Jerusalem, 1999). The internal consistency in this study was $\alpha = 89$.

Emotion Regulation Competencies were assessed with the Emotion Regulation Questionnaire (ERQ: Gross & John, 2003). Ten items assess reappraisal and suppression on a 7-point Likert scale ranging from 1, *don't agree* to 7, *agree absolutely*. The items are aggregated on two subscales using the mean of the respective items. The English version showed internal consistencies between $\alpha = .68$-$.82$ in different studies and the retest-reliability was $r_{tt} = .69$ over

a period of 3 months (Gross & John, 2003). The German translation showed comparable psychometric properties (Abler & Kessler, 2009). The internal consistency in this study was α = .66 for reappraisal and α = .87 for suppression.

Loneliness was measured using a composite score of two single items from other scales. The first item of the loneliness scale derived from the Brief Symptom Inventory–18 (BSI-18: Spitzer et al., 2011). The item formulation was *"How strong did you experience feelings of loneliness during the past 7 days?"* and it was answered on a 5-point Likert scale ranging from 0, *not at all* to 4, *very strong*. The second item derived from the Social Functioning Questionnaire (SFQ: Tyrer et al., 2005). The item formulation was *"I feel lonely and isolated from other people"* and it was answered on a 4-point Likert scale ranging from 0, *almost all the time,* to 3, *not at all*. This item was recoded before building the sum score with the other item of the scale. The internal consistency of this short loneliness scale was α = .75.

Dysfunctional Disclosure was measured using the Disclosure Questionnaire (Mueller & Maercker, 2006) in an abbreviated form (Pielmaier & Maercker, 2011). The 12 items can be divided into the three subscales *urge to talk*, *reluctance to talk*, and *emotional reactions while disclosing*. The response format is a 6-point Likert scale ranging from 0, *not at all* to 5, *absolutely*. The total score is formed by summing up the individual items either to the subscales or the whole scale. In the long version, Cronbach's α ranged between .82-.87 and the retest-reliability in a period of 1-3 months ranged between r_{tt} = .76 - .89 for the subscales (Mueller, Beauducel, Raschka, & Maercker, 2000). The internal consistency in this study was α = .79.

Perceived Social Support was assessed using the Social Support Questionnaire, short form – German (FSozU-K: Fydrich, Sommer, Tydecks, & Brähler, 2009). It consists of 14 items that are answered on a 5-point Likert scale ranging from 1, *don't agree* to 5, *agree*. The total score is built by the mean of all items answered to avoid problems with missing data (Fydrich et al., 2009). The FSozU-K showed high internal consistency (α=.94), a high retest reliability

over a period of one week (r_{tt} = .96), and satisfactory discriminant and convergent validity (Fydrich et al., 2009). The internal consistency in the present study was α = .90.

Positive and negative support resources were assessed with items from the Daily Hassles Scale (Perkonigg & Wittchen, 1995). Six items each measured positive and negative support from partner, children, parents, siblings, friends, and neighbors. The response format was a 4-point Likert scale ranging from 1, *often* to 4, *never*. In order to facilitate interpretation, all items were reverse coded, so that a higher score indicated a more positive or more negative support resource. Total scores were computed using the mean of all items. The internal consistency was α = .65 and α = .68 for positive and negative social support, respectively.

Data Analysis

Statistical analyses were conducted using IBM SPSS Statistics, Version 23 , and MPlus, Version 8 (Muthén & Muthén, 1998-2017). We performed multivariate outlier analysis using the Mahalanobis distance (Penny, 1996). Five cases were excluded from the analysis because they were multiple outliers on the scales of interest. Furthermore, six cases were excluded from the analysis because they showed a z-score > 3.29 on at least one of the scales (Field, 2013). The final sample size for the analysis was *N*= 321. Four cases did not have data of the CIDI due to technical problems with the computer program. One participant refused to answer any questions in the AjD module. Hence, the sample size for the logistic regression was reduced to *n*= 316.

Path model: To investigate the relationship between predictor variables and AjD symptom severity as outcome, we conducted a path analysis. We formulated an initial model with general self-efficacy (intrapersonal), loneliness and dysfunctional disclosure (both interpersonal) as proximal predictors of AjD symptom severity. These variables refer to the first level of the socio-interpersonal model and were thus expected to be directly linked to AjD

symptom severity. We further included suppression and reappraisal (both intrapersonal) as emotion regulation strategies. The second level of the socio-interpersonal framework model was represented by perceived social support, and positive and negative support resources (all interpersonal). They served as distant, exogenous variables in the model. In a first step, we formulated a restricted model (Figure 1, unbroken lines), in which the effects of the intra- and interpersonal variables were separated. Based on the modification indices, we allowed further predictions and covariations between the predictors in subsequent steps (Figure 1, broken lines). We used the robust maximum likelihood (MLR) estimator for model estimation. Standard recommendations for assessing model fit of the final model were followed (Hu & Bentler, 1999): a chi-square to degree of freedom ratio (χ^2:df) of less than 3:1, a Comparative Fit Index (CFI) > .90, a Tucker-Lewis Index (TLI) > .90, a Root-Mean Square Error of Approximation with 90% confidence intervals (RMSEA), and Standardized Root Mean Square Residual (SRMR) < .08 were defined as acceptable. The Bayesian Information Criterion (BIC) was used to compare relative model fit and the model with the lowest BIC was considered best fitting.

Logistic regression analysis was used to investigate predictors of AjD diagnostic status. In scales that used sum scores, missing value imputation was performed using the mean of the remaining items on that scale for the respective person (Little & Rubin, 2002). No missing values were imputed in scales that used mean scores. We calculated a model containing gender, age, and the same predictor variables as in the path model. The resulting B values of the logistic regression were transformed into standardized β weights (King, 2007).

Results

Descriptives

The prevalence of AjD was 25.6% (*n*= 81), with a marginally significant higher proportion of women (30.7%) being diagnosed than men (21.1%; $\chi^2(1)= 3.80$, $p= 0.051$). Women on average also showed higher AjD symptom severity than men ($t(309)= -2.60$, $p <$

.05). For 23.1% (*n*= 73) the job loss was the only event they reported, 30.4% (*n*= 69) reported having experienced one life event besides the job loss within the past year, 21.5% (*n*= 68) reported two other life events, and 25.0% (*n*= 35) experienced three or more other life events in the 12 months before the interview. The most prevalent life events besides the job loss were illness or death of a loved one (35.5%, *n*= 112), financial problems (31.6%, *n*= 100), and family conflicts (28.5%, *n*= 90). The correlation coefficients between the study variables can be found in table 7.

Table 7

Correlation between Study Variables (Pearson coefficient) (N = 321)

	Age	Loneliness	Disclosure	Perceived support	Positive resources	Negative resources	Self-efficacy	Suppression	Reappraisal
AjD symptom severity	.15**	.40***	.68***	-.22***	-.06	.30***	-.35***	.07	.00
Age	-	-.06	.02	-.04	.00	-.08	-.01	-.03	.13*
Loneliness		-	.39***	-.42***	-.23***	.37***	-.40***	.17**	-.02
Dysfunctional Disclosure			-	-.19**	-.05	.30***	-.24***	.11	.07
Perceived support				-	.48***	-.33***	.42***	-.31***	.24***
Positive resources					-	-.12*	.14*	-.22***	.19**
Negative resources						-	-.33***	.11	-.10
Self-efficacy							-	-.17**	.25***
Suppression								-	.14*

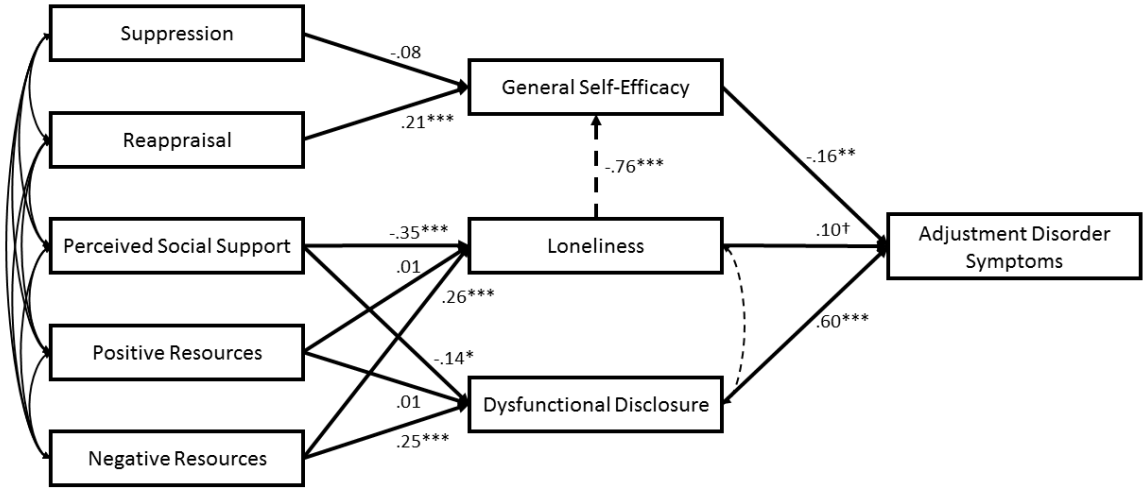
* p < .05 ** p < .01 *** p < .001

Path Model

Figure 5 provides the path model for the prediction of AjD symptom severity irrespective of diagnostic status. The initially specified restricted model exhibited insufficient model fit across all indices (*Model 1*: χ^2= 113.8, df= 15; CFI= .76, TLI= .58, RMSEA 90% CI= .14 (.12;.17), SRMR= .10; BIC= 6801.7). The first modification included the regression of self-efficacy on loneliness and model fit was improved (*Model 2*: χ^2= 67.9, df= 14; CFI= .87, TLI= .76, RMSEA= .11 (.09;.14), SRMR= .07; BIC= 6758.8). As a second modification, the correlation between the residual covariances of loneliness and dysfunctional disclosure was freely estimated and model fit was again improved (*Model 3*: χ^2= 39.5, df= 13; CFI= .94, TLI= .87, RMSEA= .08 (.05;.11), SRMR= .04; BIC= 6735.6). The third modification allowed the correlation between the residual covariances of loneliness and self-efficacy to be freely estimated and fit of the final model was excellent across all indices (*Model 4*: χ^2= 16.0, df= 12; CFI= .99, TLI= .98, RMSEA= .03 (.00;.07), SRMR= .03; BIC= 10544.1). However, the BIC indicated the superiority of model 3, thus Model 3 was chosen as interpretable model as it showed acceptable fit across the majority of indices.

The final model (Figure 5) indicates that general self-efficacy was negatively associated with AjD symptom severity (β= -.16, p < .01) while dysfunctional disclosure was positively associated with AjD symptom severity (β= .60, p < .001). The association between loneliness and AjD symptom severity was positive and marginally significant (β= .10, p = .053). Reappraisal was positively associated with general self-efficacy (β= -.21, p < .001). Perceived social support was negatively associated with loneliness (β= -.35, p < .001) and dysfunctional disclosure (β= -.14, p < .05). Negative support resources were positively associated with loneliness (β= .26, p < .001) and dysfunctional disclosure (β= .25, p < .001). Based on the modification indices, we identified a negative association between loneliness and general self-

efficacy (β= -.14, p < .05) and a significant correlation between the residual variances of loneliness and dysfunctional disclosure (r= .30, p < .001).



N = 321. The figure displays standardized path coefficients between intra- and interpersonal predictors and adjustment disorder symptoms. Broken lines indicate changes between the initial and the final model based on modification indices. Double-headed arrows between endogenous variables indicate correlations between residual variances. All correlations were significant, except for reappraisal and negative resources.

†p < .06, *p < .05, **p < .01, ***p < .001.

Figure 5: *Final Path Model predicting Adjustment Disorder Symptomatology*

Logistic Regression

Table 8 shows the results of the binary logistic regression analysis with AjD diagnostic status as outcome. It showed a significant fit with the data (χ^2(10, N= 316)= 88.50, p < .001). Loneliness (*OR*= 1.44, 95% CI [1.11, 1.85]), dysfunctional disclosure (*OR*= 1.11, 95% CI [1.06, 1.15]), perceived social support (*OR*= 2.93, 95% CI [1.47, 5.85]), and negative support resources (*OR*= 1.96, 95% CI [1.05, 3.65]) were significantly, and positively associated with a higher probability of an AjD diagnosis. General self-efficacy showed a significant, and negative

association with the outcome (*OR*= 0.89, 95% CI [0.82, 0.97]). Age showed a marginally significant, and positive association with the probability of AjD diagnosis (OR= 1.03, 95% CI [1.00, 1.06]). In total, 36% of the variance could be explained by the variables included in the model ($R^2_{\text{Nagelkerke}}$= .36).

Table 8

Logistic Regression Results for the Diagnosis of Adjustment Disorder (n = 316)

			95% CI	
	β	OR	Lower	Upper
Sex (male)	-.02	0.88	0.46	1.68
Age	.06*	1.03	1.00	1.06
Intrapersonal				
General self-efficacy	-.10**	0.89	0.82	0.97
Reappraisal	-.01	0.97	0.74	1.27
Suppression	-.03	0.89	0.67	1.19
Interpersonal				
Loneliness	.10**	1.44	1.11	1.85
Dysfunctional disclosure	.16***	1.11	1.06	1.15
Perceived social support	.13**	2.93	1.47	5.85
Positive support resources	-.01	0.90	0.51	1.60
Negative support resources	.07*	1.96*	1.05	3.65

Note. R^2=.36 (Nagelkerke) .25 (Cox & Snell). Model χ^2= 88.50, p < .001
* p < .05; ** p < .01; *** p < .001

Discussion

The current study aims to contribute to the still sparse research on adjustment disorder by applying the socio-interpersonal framework model to identify risk factors. The prevalence

of AjD according to the ICD-11 definition at 25.6% found in this sample showed that involuntary job loss significantly affects the well-being of the individuals concerned, and that a significant proportion develop symptoms of a diagnosable disorder. As can be seen by the high co-occurrence of other stressors, such as financial troubles or family conflicts, job loss has a multitude of implications and it can be accompanied by a disruption of other important areas of life.

Based on the socio-interpersonal framework model, we identified loneliness and dysfunctional disclosure as being associated with AjD symptom severity. Both mediated the relationship between the perceived social support and AjD symptomatology, and between negative support resources and AjD symptomatology. This supports the assumption of different layers and differential influences in the model. The conceptualization of feelings of loneliness and dysfunctional disclosure in the present study relate to the social reality of the patients while the social support variables reflect interactive phenomena (Maercker & Horn, 2013). Consequently, loneliness and dysfunctional disclosure would be stronger associated with psychopathological symptoms, such as preoccupation with the stressor and failure to adapt, than social support (Maercker & Horn, 2013). The significant association between general self-efficacy and loneliness in explaining AjD symptom severity is in line with the view that the socio-interpersonal framework model adds to previous research that mostly focused on intrapersonal processes (Maercker & Horn, 2013).

Against expectations and in contrast to previous findings (Maercker, Hilpert, & Burri, 2016), perceived social support was positively associated with AjD diagnostic status, indicating a higher probability of AjD diagnosis with higher perceived social support. This could be explained by the fact that in high stress situations people activate their social resources to regulate emotion (Lakey & Orehek, 2011). It might be that those people suffering more under the job loss rely more on their social contacts and therefore perceive their social support as

higher. Another explanation of this finding could be the presence of a suppressor effect as perceived social support showed no association with diagnostic status in the univariate analysis in preparation of the logistic regression. A suppression effect in this case could mean that due to another predictor, e.g. loneliness, the association between social support and AjD symptom severity gets stronger. As we used multiple measures of social support, one possible explanation of a suppression effect could be multicollinearity in the data. However, the tolerance and variance inflation factor indicated no sign of multicollinearity. Due to concerns regarding power in the logistic regression, we were not able to test interaction effects between the independent variables, which could shed further light into possible suppression effects. The likelihood of suppressor effects and the role of perceived social support in the development of AjD should therefore be subject to future research.

One noticeable finding of the present study was the strong link between dysfunctional disclosure and AjD. A strong association between dysfunctional disclosure and symptoms of maladjustment to stress has been reported in previous studies (Fankhauser et al., 2010; Krutolewitsch et al., 2016) and can be explained by both theoretical assumptions and by measurement issues. Early theories assume that disclosure of experiences reduces stress through restructuring and reorganizing contents of the experience (Pennebaker, 1989). In stress-response syndromes, recurrent distressing thoughts are assumed to occur when stressful information is represented in active memory but not completely integrated into an individual's cognitive schema (Horowitz, 1986). In the ICD-11 AjD definition recurrent distressing thoughts are reflected in preoccupation with the stressor. Not disclosing experiences or disclosing them in a dysfunctional way might thus interfere with the integration of the stressful experience into the self-concept and lead to preoccupation with it. Furthermore, the DTQ measure includes a scale of emotional reactions while disclosing. This scale assesses reactions such as tension, sadness, trembling, and exhaustion during or after disclosure. These reactions are to a certain

extent similar to symptoms that individuals experience when they encounter problems of an adjustment disorder. The correlation between both measures suggest that there is some similarity between adjustment disorder symptoms and dysfunctional disclosure, however they can still be considered separate constructs. Future research could focus on the relationship between disclosure and AjD symptom development by focusing on different aspects of the disclosure process.

One limitation of the present study is the cross-sectional nature of the data used for the analyses. All results are based on associations; hence all predictions in the two models were purely statistical. There may be also reverse effects of AjD on the processes that we investigated, and we cannot entirely disentangle cause and effect. Further analyses are planned for the longitudinal part of the study. Also, we were not able to collect pre job-loss data. To separate cause and effect of the event, a prospective longitudinal design would be needed. In addition, the data were mainly recorded by self-report questionnaires. The respective information still represents the personal view of the individual, which in particular makes the differentiation between intrapersonal and interpersonal processes harder. Moreover, one should bear in mind that our selection of intra- and interpersonal variables is not exhaustive. Accounting for the interaction of an individual with its environment is still neglected in clinical psychology (Maercker & Horn, 2013) and the socio-interpersonal framework wants to stress these contextual factors in psychopathology. Future studies should consider more objective measures and incorporate a more diverse set of variables. Job loss in an industrial country with high employment rates is of course a phenomenon that is different from other conditions of unemployment around the world. The socio-interpersonal model should be considered in future research on stress-related disorders and be applied to different contexts of work-related or economic strains.

This paper transferred a model on etiological factors of stress-response syndromes to the AjD context. It should be taken into consideration that there are also quantitative and qualitative differences between those disorders regarding presenting symptoms and precipitating life events (Maercker et al., 2013). As AjD has often been a hybrid of depressive and anxiety symptoms before (Fei, Ospedaliero, & Careggi, 2014), the new conceptualization aims at AjD as a self-sufficient diagnosis. Consequently, research should also focus on differential predictive factors and on finding pathognomonic risk factors for AjD.

Conclusion

The transition to unemployment creates a significant burden to the majority of individuals affected. Several processes that are associated with worse mental health outcome after job loss could be identified in the present study. A broader awareness and a deeper understanding of impairments in the unemployed population could lead to better service provision. Our findings support basic assumptions of the socio-interpersonal framework model for stress-response syndromes, supporting the new conceptualization of adjustment disorder. The integration of contextual factors in the understanding of the disorder can deepen our understanding of reactions to stressful life events and lead to more effective interventions.

8.3. The Course of Adjustment Disorder Following Involuntary Job Loss and its Predictors of Latent Change

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Abstract

Adjustment disorders (AjD) usually resolve after the precipitating life event and its consequences are terminated. However, they bear the risk for the development of severe mental illness. The present study investigates the natural course of AjD as defined for ICD-11. N=303 individuals who involuntarily lost their jobs were assessed initially after the job loss and 6 months later. Latent class latent change analysis and multinomial logistic regression were performed. Two groups showed low (n=149, 49.2%) and medium (n=108, 35.6%) symptom severity at initial assessment that declined over time. The third group (n=46, 15.2%) showed a high initial response and a small of worsening of symptoms. Gender, age, first dismissal, impaired social functioning, dysfunctional disclosure, social support, and social acknowledgement were associated with belonging to the latter group. It might be beneficial to target individuals at high risk with interventions that aim at the improvement of skills relevant for stress management.

The Course of Adjustment Disorder following Involuntary Job Loss and its Predictors of Latent Change

Adjustment disorder (AjD) is used to describe emotional and behavioral symptoms that can develop in reaction to psychosocial stressors, such as critical life events (American Psychiatric Association, 2013; World Health Organization, 1992). The recently proposed description for the International Classification of Diseases, 11th version (ICD-11) includes (a) the presence of a stressor, (b) preoccupation with the stressor and failure to adapt as core symptoms and (c) requires functional impairment for a diagnosis of AjD (Maercker et al., 2013). This proposal represents a major shift in the definition of the disorder as previous criteria defined AjD entirely through the exclusion of other mental disorders (American Psychiatric Association, 2013; World Health Organization, 1992). Due to its subordinate status in current classification systems, the AjD diagnosis received little research attention (e.g., Baumeister & Kufner, 2009).

AjD lies on the spectrum between normal adjustment and severe psychopathology, and has the potential for either spontaneous remission or for the development of major psychiatric disorders over time (Casey & Doherty, 2012). In the diagnostic guidelines, it is assumed that the symptoms usually resolve within six months after the event or its consequences are terminated (American Psychiatric Association, 2013; World Health Organization, 1992). However, thus far no studies have investigated the natural course of AjD as defined in ICD-11. Some conclusions can be drawn from a randomized controlled trial investigating the efficacy of a self-help intervention, in which the wait-list control group showed a decline in AjD symptoms of medium effect size over a period of four weeks (d=0.52; Bachem & Maercker, 2016b). In a recent study using DSM-5 criteria, O'Donnell et al. (2016) found that the diagnosis of AjD three months after a serious injury increased the risk for twelve months diagnosis of AjD (odds ratio = 5.45) or any psychiatric disorder (odds ratio = 2.67). Over half of the

participants with AjD at three months (55.8%) met the criteria for a psychiatric disorder at twelve months (O'Donnell et al., 2016).

Some research using previous criteria with regard to the course of AjD stems from clinical samples. Readmission rates for patients with AjD seem to be relatively low in general (5 years: 19.8%; Jäger, Burger, Becker, & Frasch, 2012) and when compared to affective disorders (1 year: 6.9% vs. 13.7%; Jones, Yates, & Zhou, 2002). However, when readmitted, 50% of the patients were re-hospitalized with a more severe disorder (Jäger et al., 2012). These results reflect the nature of AjD as being a transitory mental disorder. The symptoms generally show a positive course but at the same time, the risk for severe mental health impairments is increased. In light of the new concept of AjD for ICD-11, there is a need to investigate the course of AjD symptoms and related characteristics.

For ICD-11 and DSM-5, the AjD definition has been integrated in the context of stress-response syndromes (American Psychiatric Association, 2013; Horowitz, 2001; Maercker et al., 2013). One framework that can facilitate the identification of associated characteristics of stress-response syndromes is the socio-interpersonal perspective by Maercker and Horn (2012). The model advocates that we should broaden the perspective from traditional, intra-individual focused variables to interpersonal processes in the development and maintenance of stress-response syndromes. It defines the three layers of social-affective reactions, interaction in close relationships, and distant social contexts such as societal and cultural dimensions as relevant for the course of stress-response disorders (Maercker & Horn, 2012).

A well-researched process that would be allocated on the second layer of the socio-interpersonal framework model is social support. A lack of social support is among the strongest predictors of PTSD (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003), and it was associated with better mental health after serious life events in several studies (Maercker, Hilpert, & Burri, 2016; Prati & Pietrantoni, 2010; Rizalar et al., 2014). Social

acknowledgement as a survivor is a variable that has received increasing attention as a societal factor associated with stress-response. It reflects positive reactions from society that acknowledge the difficulty of a stressful life situation. The lack of social acknowledgement was associated with higher AjD symptoms in old age (Fankhauser et al., 2010), higher symptoms of secondary traumatization (Krutolewitsch, Horn, & Maercker, 2016), and a decrease of depressive symptoms over time (Maercker et al., 2016). Dysfunctional disclosure can be allocated between the first and second layer of the socio-interpersonal model as it reflects the individuals urge and reluctance to talk to other individuals about the event as well as the emotional reactions while disclosing (Mueller, Beauducel, Raschka, & Maercker, 2000). High dysfunctional disclosure was associated with several stress outcomes, such as higher AjD symptoms (Fankhauser et al., 2010; Mueller, Forstmeier, Wagner, & Maercker, 2011), higher symptoms of secondary traumatization (Krutolewitsch et al., 2016), and decreased life satisfaction (Maercker et al., 2016).

However, the socio-interpersonal model does not neglect the contribution of intra-individual processes in stress management. Two processes that are highly relevant for the adaptation after life stress are self-efficacy and sense of coherence. High self-efficacy, as the subjective believe to master difficult situations, was predictive for less PTSD symptoms in various settings (Bosmans & van der Velden, 2015; Heinrichs et al., 2005; Warner, Gutiérrez-doña, Angulo, Villegas Angulo, & Schwarzer, 2015) and for more personal growth after surgery (Luszczynska, Mohamed, & Schwarzer, 2005), and it was negatively associated with AjD symptoms in old age (Fankhauser et al., 2010). Sense of coherence is an indicator of resilience or health maintenance after stressful situations and reflects the ability to integrate difficult situations by perceiving life phenomena as connected and by balancing positive and negative appraisals of experiences (Bachem & Maercker, 2016a). Its revised concept was found to be negatively associated with grief, depression, anxiety, and chronic stress and positively

associated with general mental health and satisfaction with life (Bachem & Maercker, 2016a; Mc Gee, Hoeltge, Maercker, & Thoma, 2017).

The present study was conducted with two primary aims: (1) to examine the change of AjD symptom severity over a period of six months and (2) to identify predictors of change in a high-risk sample of individuals who lost their job involuntarily. There was insufficient empirical evidence to formulate specific hypothesis. Previous studies identified varying degrees of initial symptom severity (Bley, Einsle, Maercker, Weidner, & Jorarschky, 2008; Glaesmer, Romppel, Brähler, Hinz, & Maercker, 2015) and discussed different possible trajectories of symptom progression (Casey & Doherty, 2012; O'Donnell et al., 2016). We therefore expected that we would find subgroups of individuals, who differed in initial symptom severity and in change of symptom severity over time. Moreover, we wanted to examine whether demographic and psychological variables were differentially associated with the different change patterns. Based on assumptions of the socio-interpersonal framework model (Maercker & Horn, 2012) and previous studies, we expected that we would be able to identify different interpersonal and intrapersonal predictors of change.

Method

Participants and Procedure

The current analysis is part of the Zurich Adjustment Disorder Study, a longitudinal study cross-validating the proposed AjD diagnosis for ICD-11 and DSM-5. The Ethics Committee of the University of Zurich approved the study in June 2015. We recruited participants in the greater Zurich area mostly through the local employment offices, but also through newspaper articles, and mailing lists. Inclusion criteria were being laid off within 9 months prior to participation, and being aged over 18 years. Participants were excluded if they did not speak German fluently, were unable to give written informed consent, or suffered from

a severe mental illness. Participants eligible for participation were invited to two assessments, the first one (t1) up to nine months after the job loss and the second one (t2) six months later. The assessment consisted of a fully structured clinical diagnostic interview with an adapted version of the Munich Composite International Diagnostic Interview (M-CIDI; Wittchen & Pfister, 1997) that was complemented by several questionnaires. Research assistants who were trained in the M-CIDI conducted the interviews either at the University or at the participants' home. A total of 334 participants could be included in t1, 31 (9.28%) of which dropped out at t2. The main reason for dropout was that participants could not be reached again (22) or actively withdrew their participation because of time or health issues (9). This led to a final sample size of *N*=303 participants.

An overview over demographic characteristics is given in Table 1. Gender was evenly distributed across the sample (female: *n*=148, 48.8%; male: *n*=155, 51.2%). For *n*=116 (38.3%) participants it was the first job loss (female: *n*=65, 45.5%; male: *n*=51, 43.0%; $\chi^2(1)=4.016$, $p=.045$). There were no statistically significant gender differences in age ($t(301)=1.742$, $p=.083$) and duration of unemployment at t2 ($t(294)=0.453$, p=.811). The reemployment rate at t2 was 45.9% (*n*= 139) and did not differ by gender (female: *n*=68, 46.6%; male: *n*=71, 46.1%; $\chi^2(1)=0.007$, *ns*). The interval between measurement occasions was longer for women than for men ($t(299)=-2.926$, $p=.004$). The correlation between age and the interval between assessments was significant ($r=-.13$, $p=.022$).

Measures

The *Adjustment Disorder – New Module 20* (ADNM-20; Einsle, Köllner, Dannemann, & Maercker, 2010) was used to measure AjD symptom severity at both time points. The self-report questionnaire captures previous life events and evaluates AjD symptoms in response to the most straining event (Einsle et al., 2010). We used a contextualized version of the ADNM-

20 that only measured AjD symptoms in response to the job loss. The items reflect symptoms of preoccupation, failure to adapt, avoidance, affective reaction, and impulsivity. The response format of the 20 items is a 4-point Likert scale (1, '*never'* – 4, '*often'*) and a sum score can be calculated to evaluate overall symptom severity (Einsle et al., 2010). Satisfactory psychometric properties regarding factor structure, internal consistency, retest-reliability, and construct validity was found in previous studies (Bley et al., 2008; Einsle et al., 2010; Glaesmer et al., 2015). The internal consistencies in the present study were α_{t1} = .93 and α_{t2} = .94.

The *Social Functioning Questionnaire* (SFQ; Tyrer, 2005) assessed perceived social function at t1. The eight items cover different areas of function, such as work and home tasks, financial concerns, relationships, spare time activities, and sexual activities. The response format is a 4-point Likert scale, ranging from 0 (*'most of the time* (5 items) / *no problems at all* (3 items)*'*) to 3 (*'not at all* (5 items) / *severe problems* (3 items)*'*). The English version was translated in a translation – back translation process into German. A higher sum score on the SFQ indicates higher impairment in social functioning. Retest-validity and concurrent validity were satisfactory in earlier studies (Seivewright, Tyrer, & Johnson, 2004; Tyrer, 2005). The internal consistency in the present study was α_{t1} = .76.

The *Disclosure of Trauma Questionnaire* (DTQ; Mueller & Maercker, 2006) was used in an abbreviated form (Pielmaier & Maercker, 2011) to measure a dysfunctional disclosure style at t1. The urge to talk, reluctance to talk, and emotional reactions while disclosing are measured with 12 items on a 6-point Likert scale (0, *'not at all'* – 5, *'absolutely'*). The total score is obtained by summing up all individual items and higher scores are indicative for a more dysfunctional disclosure style. The scale showed satisfactory internal consistency before (Mueller et al., 2000). The internal consistency in the present study was α_{t1} = .80.

The *Social Support Questionnaire, short form – German* (FSozU-K; Fydrich, Sommer, Tydecks, & Brähler, 2009) assessed perceived social support at t1. The 14 items are answered

on a 5-point Likert scale (1, *'don't agree'*–5, *'agree'*) and the total score is built by the mean of all items that are answered by the participant to avoid problems with missing data (Fydrich et al., 2009). In the initial validation, the FSozU-K showed satisfying psychometric properties with regard to reliability and construct validity (Fydrich et al., 2009). The internal consistency in the present study was $\alpha_{t1} = .92$.

The *Social Acknowledgement Questionnaire* (SAQ; Maercker & Mueller, 2004) was used to assess the perceived acknowledgement of the difficult situation of the participant by the social surrounding. The SAQ was administered at t2 to account for the temporal component of the construct and to capture the acknowledgement during unemployment. The 16 items of the questionnaire measure general disapproval, disapproval by family or friends, and recognition as a victim. We used a contextualized version, in which every item referred to the job loss. The response format is a 4-point Likert scale ranging from 0 (*'not at all'*) to 3 (*'completely'*). The total score is built by summing up items 3, 9, and 11–16 and distracting items 1,2, 4–8 , and 10. A higher score is indicative for more acknowledgement. The reliability and validity of the scale in the initial validation study were satisfactory (Maercker & Mueller, 2004). The internal consistency in the present study was $\alpha_{t2} = .72$.

The *General Self-Efficacy Scale* (GSE; Schwarzer & Jerusalem, 1999) consists of 10 items and was used to measure general self-efficacy. The response format is a 4-point Likert scale ranging from 1 (*'not correct'*) to 4 (*'absolutely correct'*). The total score is built by summing up all individual items. The GSE showed high internal consistencies and satisfactory construct validity in earlier studies (Hinz, Schumacher, Albani, Schmid, & Brähler, 2006; Schwarzer & Jerusalem, 1999). The internal consistency in the present study was $\alpha_{t1} = .90$.

The *Sense of Coherence Scale – revised* (SOC-R; Bachem & Maercker, 2016a) was used to measure sense of coherence. The facets manageability, reflection, and balance are measured by 13 items on a 5-point Likert scale (1, *'not at all'* – 5, *'completely'*). The total score is obtained

by summing up all variables and higher scores are indicative of a stronger sense of coherence. Factorial validity, reliability, and construct validity were satisfactory in earlier validation studies (Bachem & Maercker, 2016a; Mc Gee et al., 2017). The internal consistency in the present study was $\alpha_{t1} = .68$.

Data Analysis

The analysis for this study included four parts. First, we identified varying change trajectories in the ADNM-20 sum score within a latent growth mixture modelling (LGMM) framework (Muthén & Muthén, 2000). Latent growth modelling estimates growth trajectories comprised of an intercept (baseline level) and a slope (change). LGMM extends this approach by allowing differences in growth parameters across unobserved subpopulations (classes). For each latent class, separate growth models and unique estimates of variances are modelled (Jung & Wickrama, 2008). Thus, using the LGMM framework allowed us to test whether change in AjD symptom severity is best characterized by one or more distinct growth curves. We performed a latent class growth analysis (LCGA) following Jung & Wickrama (2008). LCGA is a specific method of latent growth modelling, in which all individual growth trajectories within a class are homogenous by fixing the variance and covariance estimates for the growth factors to zero (Nagin & Land, 1993). It is to mention here, that traditionally at least three measurements are needed in order to identify a latent growth curve; however, we only had two measurements available. Therefore, we specified a latent class latent change model instead of a latent class growth model.

We estimated five models (a 2-class through to a 6-class model) using robust maximum likelihood estimation (Yuan & Bentler, 2000), with 500 random sets of starting values, and 50 final stage optimizations. The relative fit of the resulting models was compared by the Akaike Information Criterion (AIC; Akaike, 1987), the Bayesian Information Criterion (BIC;

Schwartz, 1978), the sample size adjusted BIC (ssaBIC; Sclove, 1987), and the Lo-Mendell-Rubin adjusted likelihood ratio test (LMRA-LRT; Lo, Mendell, & Rubin, 2001). For the AIC, BIC, and ssaBIC the model that produces the lowest value can be judged as best model. For the LMRA-LRT a non-significant p-value indicates that the model with one less class should be accepted.

Second, we assigned participants to groups according to their most likely class membership. Third, we used single factor analysis of variance (ANOVA) and χ^2-testing to identify univariate differences between groups. ANOVA was used for the continuous outcomes and group membership was entered as the factor. χ^2-tests were used with the categorical outcomes. Fourth, we applied multinomial regression analysis to identify correlates that were associated with group membership on a multivariate level. We entered variables that showed effects in the univariate analysis.

We used MPlus, version 8 (Muthén & Muthén, 2017) and IBM SPSS Statistics, version 23 for data analysis. All values were z-standardized prior to inclusion in the latent class latent change model and the multinomial regression.

Results

Descriptives

For the time between the job loss and t2, the job loss was the only event for 12.2% (*n*= 37) of the participants, 22.1% (*n*= 67) reported having experienced one further life event, 22.8% (n= 69) reported two further life events, and 42.9% (*n*=130) experienced three or more other life events between the job loss and the second assessment. The most prevalent life events besides the job loss were illness or death of a loved one (47.9%, *n*= 145), financial problems (34.3%, *n*= 104), family conflicts (34.3%, *n*= 104), conflicts with public authorities (20.1%, *n*= 61), and moving to a new home (19.8%, *n*= 60).

Table 9

Demographic Information and Descriptive Statistics of the Main Measures for the Whole Sample and Divided by Gender

	Full sample (N = 303)		Male (n = 155)		Female (n = 148)		Gender Effect
	M	*SD*	*M*	*SD*	*M*	*SD*	*d*
Age (years)	44.0	10.8	45.1	10.4	42.9	11.0	0.21
Interval between measurements (months)	6.2	0.6	6.1	0.5	6.3	0.7	-0.33
Duration of unemployment at t2 (months)	7.0	3.3	7.1	3.4	6.9	3.2	0.06
AjD (t1)	41.9	12.6	39.8	11.8	44.2	13.0	-0.35
AjD (t2)	37.5	12.6	35.4	11.1	39.7	13.6	-0.35
Impairment in social functioning	6.2	4.0	5.6	3.8	6.8	4.1	-0.30
Dysfunctional disclosure	14.8	8.9	13.4	8.1	16.2	9.4	-0.32
Perceived social support	4.3	0.7	4.3	0.6	4.2	0.8	0.14
Social acknowledgement	2.7	6.6	2.2	6.4	3.2	6.9	-0.15
General self-efficacy	31.0	5.0	31.5	4.7	30.5	5.3	0.20
Sense of coherence	51.1	5.7	51.5	5.7	50.8	5.6	0.12

Table 9 provides an overview of the descriptive statistics of the main measures of the study. The decline in AjD symptom severity between t1 and t2 was significant ($t(268)=6.271$, $p=.000$, $d=0.35$). There were gender differences in adjustment disorder symptom severity at t1 ($t(285)=-3.027$, $p=.003$) and at t2 ($t(283)=$, $p=.004$), in impairment in social functioning ($t(292)=-2.530$, $p=.012$), and in dysfunctional disclosure ($t(293)=-2.794$, $p=.006$). The differences in perceived social support ($t(301)=0.220$, $p=.826$), social acknowledgement ($t(275)=-1.281$, $p=.201$), general self-efficacy ($t(297)=1.734$, $p=.084$), and sense of coherence

(*t*(291)=1.005, *p*=.316) were not significant. Age and AjD symptom severity at t1 correlated significantly (*r*=.14, *p*=.017).

Latent class latent change model

Table 10 displays the fit statistics for the latent class latent change model. The AIC and ssaBIC were smallest for a solution with six classes. The BIC was smallest for a solution with 3 classes and the LMRA-LRT was non-significant for the 4-class model, suggesting the superiority of the 3-class model. Based on the results of the BIC and the LMRA-LRT, and with consideration to issues of model interpretability and parsimony, the 3-class solution was considered the best fitting solution. Figure 1 displays the transition from t1 to t2 for each class.

Table 10

Fit Statistics for the Latent Class Latent Change Model

Classes	**Loglikelihood**	**AIC**	**BIC**	**ssaBIC**	**Entropy**	**LMRA-LRT (p)**
2	-730.35	1474.70	1500.69	1478.49	.743	142.15 (.000)
3	**-703.46**	**1426.93**	**1464.06**	**1432.35**	**.764**	**50.80 (.001)**
4	-696.54	1419.07	1467.35	1426.12	.763	13.09 (.112)
5	-690.25	1412.50	1471.92	1421.18	.728	11.88 (.065)
6	-681.25	1400.51	1471.07	1410.81	.769	17.00 (.091)

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; ssaBIC= sample-size adjusted BIC; LMRA-LRT= Lo-Mendell-Rubin adjusted likelihood ratio test; BSLRT = Bootstrapped LRT. Selected class solution in bold.

Participants were then assigned to groups based on their most likely class membership. The first group (*low*; n=149, 49.2%) was characterized by relatively low mean AjD symptom severity at t1 (*M*=33.0, *SD*=8.5) and at t2 (*M*=27.6, *SD*=5.0; t(135)=7.005, p=.000, d=0.77), whereas the second group (*medium*; n=108, 35.6%) was characterized by medium mean AjD

symptom severity at t1 (*M*=46.9, *SD*=7.9) and at t2 (*M*=42.5, *SD*=5.4; *t*(94)=4.273, *p*=.000, *d*=0.65), and the third group (*high*; n=46, 15.2%) was characterized by relatively high mean AjD symptom severity at t1 (*M*=57.3, *SD*=9.5) and at t2 (*M*=60.1, *SD*=5.8; *t*(37)=-1.506, *p*=.141, *d*=-0.36). Interestingly, the low and medium group showed a significant decline in symptoms while the high group remained stable with a trend to deterioration of symptoms.

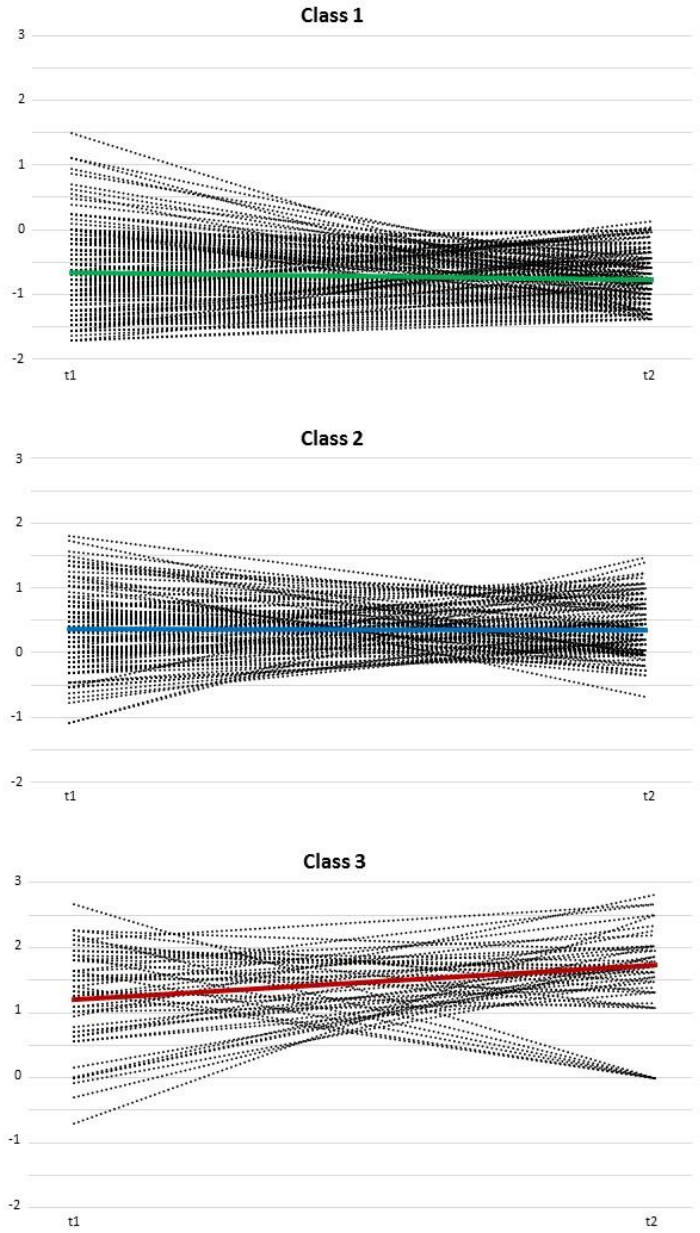

Figure 6: *Estimated Means and Observed Individual Values (z-scores) for the 3-Class Solution of the Latent Class Latent Change Analysis*

Table 11

Demographic, Job-related, and Psychological Characteristics divided by Group Membership

	Group			
	Low (n = 149, 49.2%)	Medium (n = 108, 35.6%)	High (n = 46, 15.2%)	p
Demographic				
Gender				
Male (%)	59.1	50.0	28.3	.001
Female (%)	40.9	50.0	71.7	
Age (*M (SD)*)	43.2 (11.3)	43.6 (10.3)	47.4 (9.5)	.059
Job-related				
First job loss (%)	36.9	37.0	45.7	.485
Reemployment t2 (%)	52.3	38.9	41.3	.054
Unemployment duration (*M (SD)*)	6.8 (3.2)	7.0 (3.3)	7.6 (3.6)	.363
Psychological				
Impairment in social functioning (*M (SD)*)	4.3 (3.2)	7.0 (3.1)	10.4 (4.2)	.000
Dysfunctional disclosure (*M (SD)*)	10.2 (7.2)	17.9 (7.5)	22.4 (8.5)	.000
Perceived social support (*M (SD)*)	4.5 (0.5)	4.2 (0.7)	3.8 (0.9)	.000
Social acknowledgement (*M (SD)*)	4.7 (5.8)	2.1 (5.8)	-2.1 (8.2)	.000
Self-efficacy (*M (SD)*)	32.6 (3.9)	29.8 (5.2)	28.8 (6.0)	.000
Sense of coherence (*M (SD)*)	52.8 (4.9)	49.00 (6.1)	50.7 (5.60)	.000

Note. p = statistical significance value. Single factor analysis of variance with group membership as factor was performed for continuous measures. χ^2-test was performed for categorical measures.

ANOVA and χ^2-test

The differences between groups in key demographic, job-related and psychological characteristics can be found in Table 11. In univariate analysis, the groups differed significantly in gender, impairment in social functioning, dysfunctional disclosure, perceived social support, social acknowledgement, self-efficacy, and sense of coherence. The differences in age and reemployment status at t2 were marginally significant.

Multinomial Regression

We entered all variables that were significant in the univariate analysis into a multinomial regression analysis. We also included first job loss because we observed large group differences on a descriptive level and expected to find effects. Table 12 reports the adjusted odds ratios from the multinomial regression. The model was statistically significant ($\chi^2(470)=744.44$, $p<.001$). Impairment in social functioning, dysfunctional disclosure, social acknowledgement, and sense of coherence remained significant predictors of belonging to the medium group (as compared to low). Female gender, older age, first job loss, impairment in social functioning, dysfunctional disclosure, and social acknowledgement remained significant predictors of belonging to the high group (as compared to low). Gender, age, first job loss, impairment in social functioning, and perceived social support were significant predictors of group membership in the high to medium group comparison.

Table 12

Results from the Multinomial Regression for Predictors of Group Membership

	Medium vs. low class					High vs. low class					High vs. medium class				
	b	*SD*	*p*	*OR*	95% CI	*b*	*SD*	*p*	*OR*	95% CI	*b*	*SD*	*p*	*OR*	95% CI
Gender	-0.28	0.36	.441	0.76	0.37;1.54	-1.67	0.57	**.004**	**0.19**	**0.06;0.58**	-1.39	0.53	**.009**	**0.25**	**0.09;0.70**
Age	0.03	0.18	.860	1.03	0.72;1.48	0.70	0.29	**.014**	**2.01**	**1.15;3.51**	0.67	0.27	**.013**	**1.94**	**1.15;3.28**
First job loss	-1.28	0.37	.931	0.97	0.47;2.01	-1.28	0.57	**.025**	**0.28**	**0.09;0.85**	-1.24	0.52	**.017**	**0.29**	**0.10;0.80**
Reemployment	-0.47	0.39	.221	1.60	0.75;3.41	-0.47	0.57	.413	0.63	0.21;1.91	-0.94	0.52	.074	0.39	0.14;1.09
Impairment in social functioning	0.57	0.26	**.029**	**1.76**	**1.06;2.93**	1.38	0.37	**.000**	**3.96**	**1.91;8.21**	0.81	0.32	**.012**	**2.25**	**1.20;4.21**
Dysfunctional disclosure	1.21	0.23	**.000**	**3.35**	**2.14;5.25**	1.39	0.33	**.000**	**4.01**	**2.10;7.64**	0.18	0.29	.531	1.20	0.68;2.10
Perceived social support	0.12	0.26	.652	1.12	0.68;1.86	-0.45	0.32	.156	0.64	0.34;1.19	-0.57	0.27	**.038**	**0.57**	**0.33;0.97**
Social acknowledgement	-0.52	0.24	**.028**	**0.60**	**0.37;0.95**	-0.88	0.33	**.009**	**0.42**	**0.22;0.80**	-0.36	0.29	.222	0.70	0.39;1.24
Self-efficacy	0.19	0.25	.456	1.20	0.74;1.96	0.48	0.34	.153	1.61	0.84;3.11	0.29	0.27	.286	1.34	0.78;2.30
Sense of coherence	-0.79	0.24	**.001**	**0.46**	**0.28;0.73**	-0.23	0.35	.510	0.80	0.40;1.57	0.56	0.31	.074	1.75	0.95;3.21

Note. All predictor variables measured at t1, except reemployment (refers to the time between t1 and t2). *b* = regression weight; *SD* = standard deviance; *p* = statistical significance value; *OR* = Odds Ratio; 95% CI = 95% confidence interval; significant effects in bold.

Discussion

The aim of the present study was to examine the course of AjD symptom severity over time and to identify characteristics that were associated with change. Three groups with differing latent change patterns, reflecting low symptom severity, medium symptom severity, and high symptom severity, were identified. Over the course of six months, the low and the medium symptom group showed a decline of symptomatology of medium effect size. Most interestingly, 15% of the individuals reported very high symptoms in response to the job loss at the first assessment and a small increase of symptoms at the six months follow-up. Female gender and higher age were associated with belonging to the latter group. Furthermore, the vast majority of participants experienced further life stressors, such as problems in the family or financial difficulties, after the job loss, highlighting the manifold implications of job loss for other important areas of life. It could be advisable to target specific groups that are at high risk of more severe symptomatology and unfavorable course of symptoms, such as females and older individuals, with selective prevention strategies.

In accordance with the socio-interpersonal perspective proposed for stress-response syndromes (Maercker & Horn, 2012), several psychological processes were associated with group membership. In line with earlier findings, higher dysfunctional disclosure was associated with worse outcome whereas higher perceived social support, higher social acknowledgement, and higher sense of coherence were associated with lower symptom severity and better prognosis (cf. Fankhauser et al., 2010; Maercker et al., 2016; Mc Gee et al., 2017). Regarding interventions training the social-interpersonal abilities e.g., training of communication skills to increase cognitive processing of the event and to decrease preoccupation (e.g., Pennebaker, 1995) or activating social support resources to buffer the negative effects of the job loss (e.g., Cohen & McKay, 1984), could increase chances of symptom improvement.

Distinguishing clinical relevant symptoms from a normal stress-response is one of the recurring issues with regard to AjD (Casey & Doherty, 2012; Keeley et al., 2016). Besides defining specific symptoms, ICD-11 will most likely incorporate a criterion of significant impairment in their diagnostic guidelines (cf. Maercker et al., 2013) as an attempt to differentiate disorder from non-disorder. In the present study, impairment in social functioning at t1 was the only predictor associated with group membership in each comparison. Individuals who reported higher impairment were more likely to belong to the medium or high group. These results indicate that impairment in social functioning is associated with worse outcome. The degree of symptom severity and the degree of impairment in social functioning seem to increase in parallel, so one could argue that impairment in social functioning provides redundant information. However, several studies supported the unidimensionality of the currently investigated AjD symptoms, indicating that there could be a more parsimonious solution to describe AjD accurately (e.g., Glaesmer et al., 2015; Lorenz, Hyland, Perkonigg, & Maercker, 2017). Furthermore, there is evidence for the validity of preoccupation with the stressor and failure to adapt as two separate core symptoms (Kazlauskas et al., 2017; Lorenz et al., 2017; Zelviene et al., 2017). If the degree of functional impairment is a strong indicator for the degree of AjD symptomatology, a description of the disorder that focuses on the core symptoms and functional impairment might be the most efficient solution. The present findings suggest that impairment in social functioning might be a strong indicator for initial symptom severity and course of symptoms, and further research should focus on its relationship with the core AjD symptomatology.

The ICD-11 description includes that the symptoms of an AjD typically resolve within six months, unless the stressor persists for a longer duration. In the present study, we included individuals up to nine months after their job loss in the first assessment based on the assumption that the effects of job loss do not end with the last day of work. The six months interval between

measurements was chosen to investigate whether AjD symptoms in fact typically resolve within six months. We found that at the second assessment, i.e. up to fifteen month after the job loss, a significant proportion still reported medium or high symptom severity, questioning the validity of the six months time frame. We did not investigate diagnostic status of AjD and we did not control for the presence of other psychiatric disorders that would exclude AjD as a diagnosis, thus further studies should include this focus in their designs. Furthermore, reemployment was not predictive for group membership, suggesting that the end of the stressor and its consequences, i.e. not being unemployed anymore, did not have a significant impact on symptom development. As literature on the course of AjD is limited, future research should investigate fluctuations in symptomatology, e.g., with designs that repeatedly measure AjD at different time points after the occurrence of a stressor.

Several aspects of the study limit the generalizability of the findings. First, the data in the present analysis stem from a very specific sample. Losing employment in Switzerland, a country with a high socio-economic status, is most likely different from unemployment under other conditions. The high social security in Switzerland leads in most cases to a less existential financial threat, which allowed us to focus on psychological processes in the adjustment process. Second, unemployment as the only precipitating event for AjD symptoms in the present study limits generalizability to other contexts, in which AjD can occur. However, the advantage of this sample was the expected high stress response as job loss has a multitude of implications for everyday life. Third, the data has been collected using a self-report assessment that could result in both aggravation and understatement of symptoms. Other means of assessment and sources of information could help to depict a more generalizable picture of the disorder. Fourth, we did not collect data about interventions or treatment that the participants received after the job loss. The content and quality of the mandatory counselling in the employment offices or any psychological treatment that the individuals received could have

had an effect on the course of symptoms that we could not account for. Finally, the design of the study did not allow us to collect pre job loss data, which would have been helpful to identify risk factors that are of relevance before a critical life event. Future studies should investigate various stressors, use different means of assessment and might incorporate a prospective design to corroborate present findings.

This is the first study to investigate the natural course of AjD symptoms according to the new ICD-11 concept. Individuals differed in their initial response to the job loss by different levels of symptom severity and their course of symptoms over a period of six months. Dysfunctional disclosure, social support, social acknowledgement, and sense of coherence were differentially associated with group membership. The stress-response conceptualization and the socio-interpersonal framework were valuable to identify characteristics that were associated with change. Our results imply that specific selective prevention that targets individuals at high risk might be a useful intervention strategy after involuntary job loss.

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10.Appendix: Curriculum Vitae

Personal Details	
Name	Louisa Lorenz
Adress	Poststrasse 8 CH-8953 Dietikon
Phone	0041 - 78 / 623 02 14
E-Mail	lorenz.louisa@gmail.com
Date of Birth	18/06/1990
Place of Birth	Lüneburg, Germany

Current Education	
03/2017 – current	**Postgraduate Training Program in Psychotherapy** Psychotherapy with cognitive behavioral and interpersonal focus Klaus-Grawe-Institute for Psychological Therapy Zurich
09/2016 – current	**Certificate of Advanced Studies Higher Education Didactics** University of Zurich
11/2015 - current	**LIFE Fellow** International Max Planck Research School (IMPRS) on the Life Course
08/2015 – current	**PhD Candidate in Psychology** University of Zurich

Degrees	
08/2013 – 07/2015	**Master of Science in Clinical and Health Psychology** (Grade: 6) University of Zurich
08/2010 – 07/2013	**Bachelor of Science in Psychology** (Grade: 5.3) University of Zurich
08/2002 – 07/2008	**General Qualification for University Entrance** (Grade: 1.7) Gymnasium Herderschule Lüneburg

Qualification Theses	
Dissertation (current)	Adjustment Disorder as Proposed for ICD-11: An Empirical Investigation of its Validity and Application of a Socio-Interpersonal Framework Model among Individuals who Experienced Involuntary Job Loss.
Master (2015)	[Adjustment Disorder – New Module 20. Construct Validity, reliability and cut-off-scores]. (Grade: 6)
Bachelor (2013)	[Cognitive Behavior therapy in the treatment of prolonged grief disorder]. (Grade: 6)

Academic Experience	
05/2015 – current	**Assisstant** Unit for Psychopathology and Clinical Intervention Head of Division Prof. Dr. Dr. Andreas Maercker Department of Psychology, University of Zurich

02/2014 – 07/2015	**Tutoring Assisstant** Unit for Clinical Psychology with Focus on Psychotherapy Research Head of Division Prof. Dr. Birgit Watzke Department of Psychology, University of Zurich
02/2013 – 05/2013	**Research Intern** Unit for Clinical Psychology (Psychotherapy for Depression) Head of Division Prof. Dr. Martin Grosse-Holtforth Department of Psychology, University of Zurich

Clinical Experience

08/2017 – current	**Clinical Psychologist** Psychotherapeutic Outpatient Clinic Centre for Trauma, Problems in Old Age and Online-Therapy Department of Psychology, Univerity of Zurich
07/2014 – 05/2015	**Nightwatch** for abstinent living addicts Forelhaus Zurich
01/2014 – 02/2014	**Intern for Clinical Psychology** Clinic for Psychiatry, Psychosomatic Medicine and Psychotherapy Rhein-Jura-Klinik, Bad Säckingen, Germany
08/2008 – 08/2009	**Volunteer** (Voluntary Social Year) Clinic for Psychiatry Lüneburg, Germany

Teaching Experience

08/2017 – current	**Lecturer „Stress-Response Syndrome“** Department of Psychology, University of Zurich
02/2017 – current	**Lecturer “Practical Training: Experiments in Psychology”** Department of Psychology, University of Zurich
08/2016 – current	**Lecturer “Case-related learning in psychopathology”** Department of Psychology, University of Zurich
08/2015 – current	**Lecturer “Psychopathology taught online (e-learning)”** Department of Psychology, University of Zurich
08/2014 – 06/2015	**Tutor “Psychopathology taught online (e-learning)”** Teacher: Prof. Dr. Dr. Andreas Maercker, Dr. Rahel Bachem Unit for Psychopathology and Clinical Intervention Department of Psychology, University of Zurich
08/2014 – 01/2015	**Tutor “Advanced Statistical Methods”** Teacher: Prof. Dr. Carolin Strobl Unit for Psychological Methods, Evaluation and Statistics Department of Psychology, University of Zurich
05/2013 – 01/2014	**Teacher „Psychologische Grundkompetenzen**“ [Basic psychological Competencies] Head of division Prof. Dr. Veronika Brandstätter-Morawietz Unit for Psychology of Motivation, Volition and Emotion Department of Psychology, University of Zurich

Student Supervision	
Master Students	Christa Rütter (2018), Viviane Pfluger (2017), Simona Lerch (2017)
Bachelor Students	Lara Barblan (2017), Jessica Grub (2016), Laila Susin (2015)

Volunteer Work	
05/2016 – current	Representative for the non-professorial academic staff in the general assembly of the Department of Psychology, University of Zurich
03/2016 – current	Co-President of "elle real" (women's football)
04/2012 – 03/2013	Online-Counselor, Lebensweg Zukunft e.V.
2006 – 2013	Member of the Program „Young EU Professionals" Federal Agency for Civic Education, Germany
2003 – 2006	Class Representative, Student Representative in the Municipal Education Authority
2000 – 2010	Volunteer in the German Lifeguard Association (DLRG)

Language Skills	
German	C2, native language
English	C1
French	B1

Awards	
09/2015	**Springer „BestMasters"-Award** Master thesis on „[Adjustment Disorder – New Module 20. Construct Validity, reliability and cut-off-scores]"

Grants	
2018	University of Zurich Publishing Fund for Social Sciences and Humanities Publication: "A Socio-Interpersonal Approach to Adjustment Disorder: The Example of Involuntary Job Loss" 1700 CHF
2017 (Group proposal)	University of Zurich, Freie Universität Berlin Workshop: "Open Science" 2.726 CHF
2017	University of Zurich, PhD Program for Psychology UZH LIFE Spring Academy 2017, Ann Arbor, Michigan 1'000 CHF
2017	University of Zurich, Faculty of Philosophy – Deanship Research Stay: Mater Misericordiae University Hospital Dublin, National College of Ireland, Dublin Jan-Feb 2017 2'600 CHF
2016	Jacobs Foundation Project: "Adjustment Disorders after involuntary job loss" 10.000 CHF

2016 (group proposal)	Jacobs Foundation Workshop: “Presentation Skills” 4.590 CHF
2016	Swiss Academy of Humanities and Social Sciences (SAGW) 50th Conference of the German Society for Psychology 500 CHF

Publications

Lorenz, L., Perkonigg, A., Maercker, A. (2018). The Course of Adjustment Disorder following Involuntary Job Loss and its Predictors of Latent Change. *Clinical Psychological Science, in press.*

Lorenz, L., Hyland, P., Maercker, A., Ben-Ezra, M. (2018). The latent structure of ICD-11 adjustment disorder in the Israeli population. *Journal of Anxiety Disorders, 54,* 65-70. https://doi.org/10.1016/j.janxdis.2018.01.007

Lorenz, L., Perkonigg, A., Maercker, A. (2018). A Socio-Interpersonal Approach to Adjustment Disorder: The Example of Involuntary Job Loss. *European Journal of Psychotraumatology, 9,* 1425576. https://doi.org/10.1080/20008198.2018.1425576

Lorenz, L., Hyland, P., Perkonigg, A., Maercker, A. (2017). Is adjustment disorder unidimensional or multidimensional? – Implications for ICD-11. *International Journal of Methods in Psychiatric Research,* e1591. https://doi.org/10.1002/mpr.1591

Kazlauskas, E., Zelviene, P., **Lorenz, L.**, Quero, S., Maercker, A. (2017). A scoping review of ICD-11 adjustment disorder research. European Journal of Psychotraumatology, 8:sup7, 1421819. https://doi.org/10.1080/20008198.2017.1421819

Lorenz, L., Bachem, R.C., Maercker, A. (2016). The Adjustment Disorder – New Module 20 (ADNM-20) as a Screening Instrument: Cluster Analysis and Cut-off Values. *The International Journal of Occupational and Environmental Medicine,* 7, 2013-2018. https://doi.org/10.15171/ijoem

Maercker, A., **Lorenz, L.,** Perkonigg, A. & Kapfhammer, H.-P. (2016). [Adjustment Disorders]. In: Möller, H.-J., Laux, G. & Kapfhammer, H.-P. (Eds.), *Psychiatrie, Psychosomatik, Psychotherapie (5th ed*.). Heidelberg: Springer

Lorenz, L. (2016). [Diagnostics of Adjustment Disorder – A questionnaire for the ICD-11 proposal]. Wiesbaden: Springer Fachmedien

Lorenz, L., Bachem, R.C., Maercker, A. (2015). *Adjustment Disorder – New Module 20. Testmanual*. Psychometrikon – psychologisch-medizinisches Testportal

Maercker, A., Bachem, R.C., **Lorenz, L.,** Moser, C.T. & Berger, T. (2015). Adjustment Disorders Are Uniquely Suited for eHealth Interventions: Concept and Case Study. *JMIR Mental Health, 2*, e15. https://doi.org/10.2196/mental.4157

Lorenz, L. & Forstmeier, S. (2013). [Cognitive behavior therapy in prolonged grief]. *Psychotherapie im Alter*, 10 (4), 453 – 464

Manuscripts in the submission process

Lorenz, L., Ho, G., Chan, A., Bressington, D., Chien, W., Shevlin, M., Hyland, P., Maercker, A., & Karatzias, A. (under review). Initial validation of a Chinese version of the Adjustment Disorder – New Module 20.

Doherty, A., Jabbar, F., O’Leary, A., **Lorenz, L.,** Casey, P. (under review). Sleep Disturbance in Adjustment Disorder and Depressive Episode.

Maercker, A., & **Lorenz, L.** (under review). Adjustment Disorder Diagnosis: Improving Clinical Utility.

Perkonigg, A., **Lorenz, L.**, Maercker, A. (under review). Prevalence and Correlates for ICD-11 Adjustment Disorder: The Zurich Adjustment Disorder Study.

Lorenz, L., Doherty, A., Casey, P. (in prep.). Does religious practice buffer the impact of negative life-events on depressive symptoms?

Congress Appearences

Perkonigg, A., **Lorenz, L.,** Maercker, A. (2017, November, Poster). Prevalence and Correlates of ICD-11 Adjustment Disorder Among Persons who had lost their Job Involuntary. 33. Annual Meeting of the International Society for Traumatic Stress Studies, Chicago, Illinois, USA

Lorenz, L., Perkoingg, A., Maercker A., (2017, September, Talk). A socio-interpersonal model for adjustment disorder following involuntary job loss. 15. Annual meeting of the Swiss Society for Psychology, Lausanne, Switzerland

Lorenz, L., Perkonigg, A., Maercker, A. (2017, June, Talk). A socio-interpersonal approach to adjustment disorder after involuntary job loss. 15th conference of the European Society for Traumatic Stress Studies, Odense, Denmark

Lorenz, L. (2017, May, Talk). The Course of Adjustment Disorder Symptoms after Involutary Job Loss. International Max Planck Research School on the Life Course Spring Academy, Ann Arbor, Michigan, USA

Pfluger, V., **Lorenz, L.**, Maercker, A. (2017, February, Poster). [Somatization Processes in People with Adjustment Disorder]. Annual Meeting of the German Speaking Society for Psychotraumatology (DeGPT), Zurich, Switzerland

Lorenz, L. (2016, October, Talk). Socio-Interpersonal Processes predict ICD-11 Adjustment Disorder Symptoms following Involuntary Job Loss. International Max Planck Research School on the Life Course Fall Academy, Berlin, Germany

Lorenz, L., & Maercker, A. (2016, June, Poster). Predictive Value of Socio-Interpersonal Factors for Adjustment Disorder Symptoms after Involuntary Job Loss. International Max Planck Research School on the Life Course Spring Academy, Charlottesville, Virginia, USA

Lorenz, L., & Maercker, A. (2016, March, Poster). [Adjustment Disorder: Predictive Factors after Involuntary Job Loss]. Annual Meeting of the German Speaking Society for Psychotraumatology (DeGPT), Hamburg, Germany

Lorenz, L., & Maercker, A. (2015, Oktober, Poster). Involuntary Job Loss: Risk and protective factors in the development of adjustment problems – study prospect. International Max Planck Research School on the Life Course Fall Academy, Stein am Rhein, Germany

Guest Lectures

Lorenz, L. (2017, February). Adjustment Disorders – Exploring the Mysteries of a Neglected Diagnosis. Guest lecture at the National College of Ireland, Dublin, Ireland

Lorenz, L. (2017, January). Adjustment Disorder after Involuntary Job Loss in a Swiss Sample. Clinical Update at the Mater University Hospital, Dublin, Ireland

Lorenz, L. (2015, November). [Adjustment Disorder after involuntary job loss]. 27. IV-RAV networking event Zurich, Zurich, Switzerland